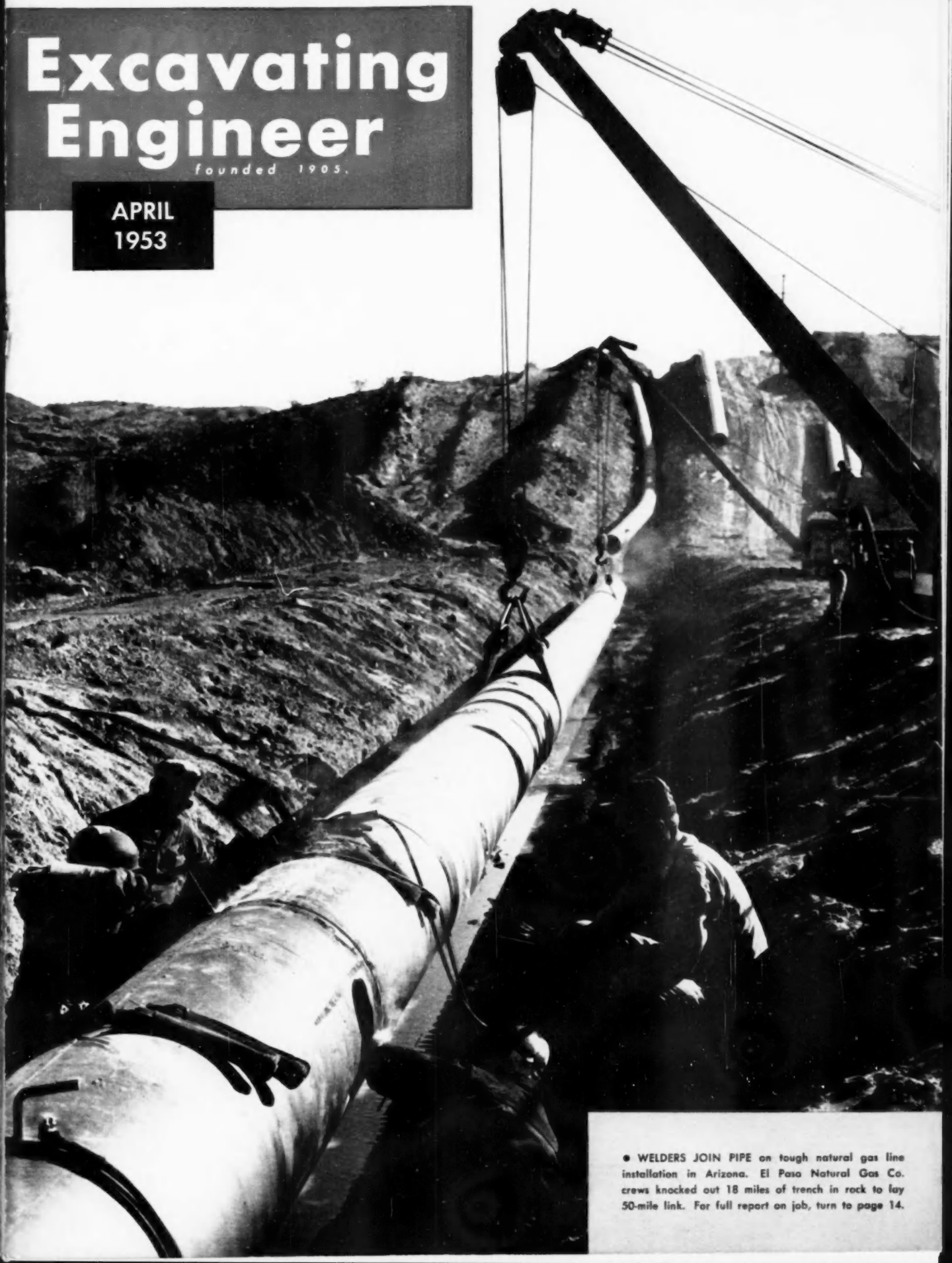
Excavating Engineer

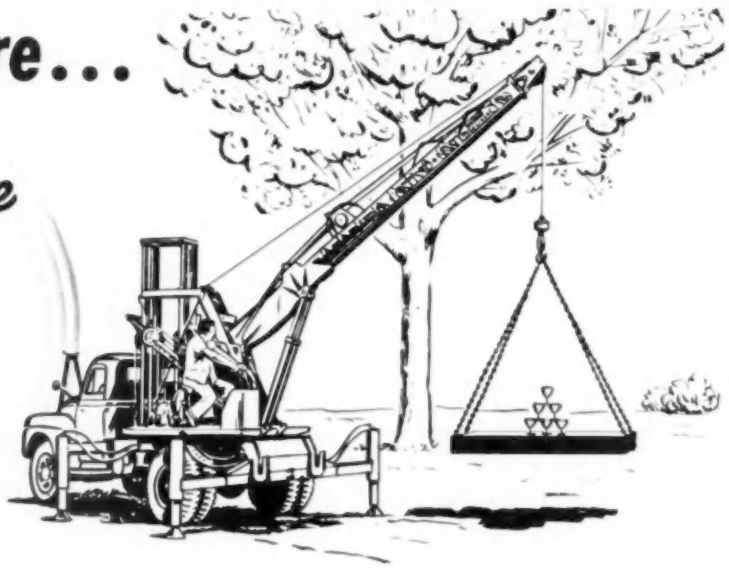
founded 1905.

APRIL
1953



• WELDERS JOIN PIPE on tough natural gas line installation in Arizona. El Paso Natural Gas Co. crews knocked out 18 miles of trench in rock to lay 50-mile link. For full report on job, turn to page 14.

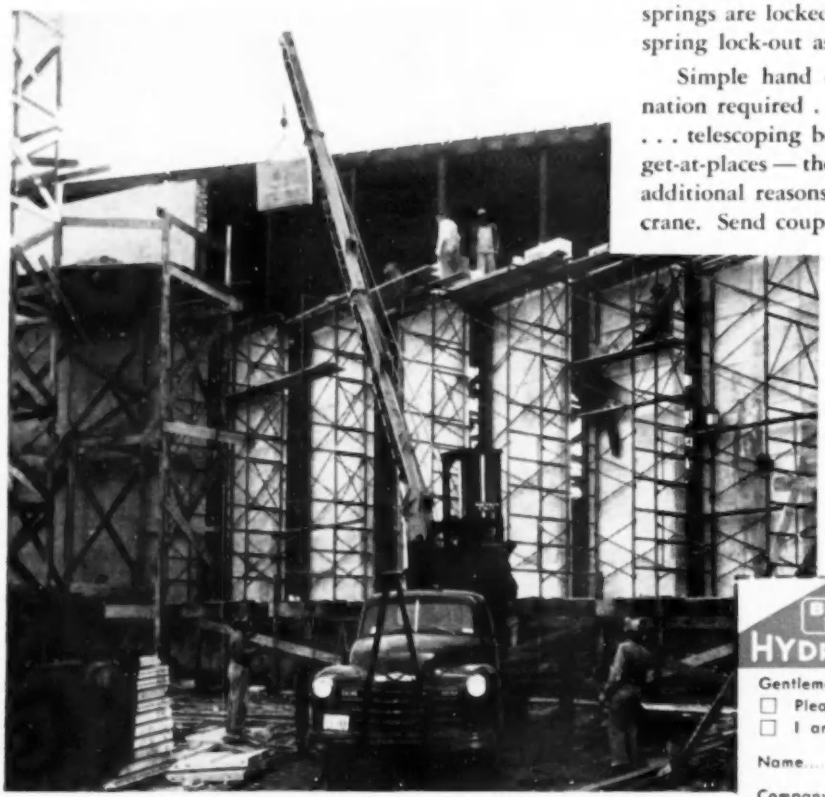
Smooth and Sure... that's *Hydrocrane* PRECISION CONTROL



No matter how carefully you must handle certain building materials — concrete slabs, brittle stone, plate glass windows, concrete buckets — you can handle them with confidence the smooth Hydrocrane way. With every crane function actuated by a liquid-smooth, cushion-action hydraulic system, Hydrocrane control is so precise loads can be moved a fraction of an inch if necessary. In actual tests this machine lifted, swung and set down a pyramid of six full drinking goblets (on a 1-ton steel test slab) without spilling a drop.

And to make this precision control pay off to the fullest extent, the Hydrocrane is equipped with four outriggers that extend in seconds, providing a rock-solid crane foundation. Truck springs are locked out through a semi-automatic spring lock-out assembly.

Simple hand controls, no hand-foot coordination required . . . 50 mph top highway speed . . . telescoping boom for reaching into hard-to-get-at-places — these are just a few of the many additional reasons why your best buy is Hydrocrane. Send coupon now.



Here the Hydrocrane with crane hook hoists a heavy stone slab to an upper story. Crane is available with additional money-making attachments — four hydraulically operated buckets, magnet and grapple plus the HYDROHOE — A DRAGSHOVEL FRONT-END THAT IS QUICKLY, EASILY ATTACHED IN THE FIELD. Ideal for trenching and foundation work.

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

BUCYRUS ERIE HYDROCRANE

South Milwaukee Wisconsin

Gentlemen:

☐ Please send Hydrocrane literature.

☐ I am interested in a demonstration.

Name.....

Company.....

Address.....

City..... State.....

154H52C

What kind of tires can your jobs afford ?

THE kind that are specifically designed for your types of jobs and equipment. The kind that only great practical experience can build. The kind that are built *sparing nothing* to bring you the greatest traction, the most rugged durability, the longest wear.

In short, the kind of tires that will keep your jobs rolling regardless—and save you time and money!

No truly cost-wise operator can afford a lesser tire—and that's why more tons, the world over, are hauled on Goodyears than on any other make!

It stands to reason that Goodyear, who has built more tires for more purposes than anyone else on earth—who has a vast practical experience matched by none, can help cut *your* operating costs, too!

Goodyear, Truck Tire Dept., Akron 16, Ohio.

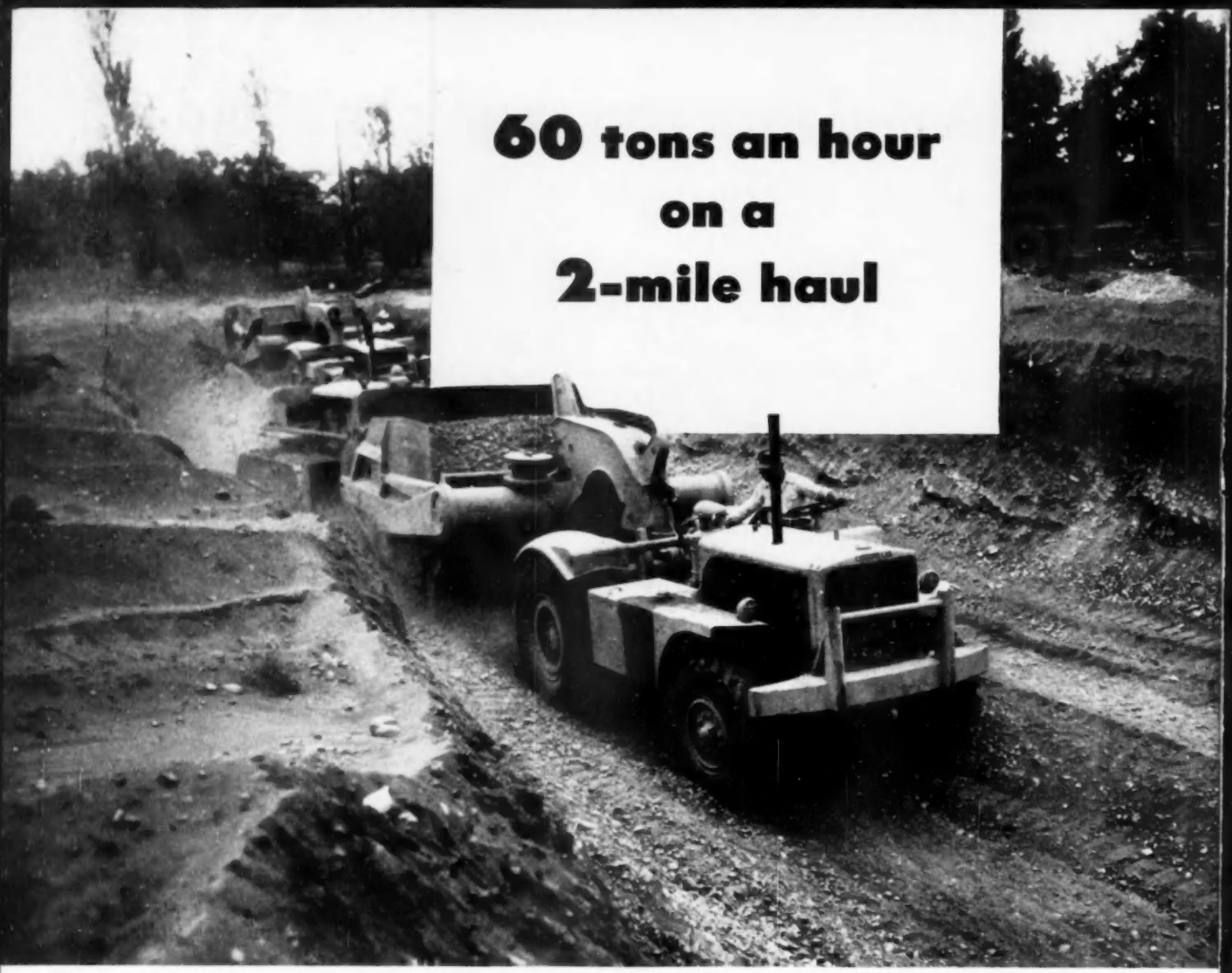
FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE!

HARD ROCK LUG
For traction and toughness on tire-killing work.
HARD ROCK RIB
front-wheel work-mate to the Hard Rock Lug.
ROAD LUG
Best on-and-off roader. Runs smoother, cooler on highway — takes the rap in the rough!

Road Lug—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD" – every Sunday – ABC Radio Network – THE GOODYEAR TELEVISION PLAYHOUSE – every other Sunday – NBC TV Network



60 tons an hour on a 2-mile haul

This Caterpillar DW10 Tractor and No. 15 Scraper are loading river gravel mixed with sand – a "dead" material, difficult to handle. Although haul distance is two miles, this husky yellow team moves 60 tons of gravel in 60 minutes. Owned by K. C. Dack of Milton, Ore., they are under hourly contract to repair a secondary road in Morrow County.

Mr. Dack has two DW10s with No. 15s hauling gravel on this job, push-loaded by a Cat* D8 Tractor. "They load faster, with bigger and better loads than any other scraper," he reports. The No. 15 Scraper is designed to be a real producer on long hauls. With its pumping action, it can get heaped loads of even "dead" material quickly and smoothly. And, with its low center of gravity, the No. 15 remains stable where the going is rough.

Its teammate, the Cat DW10 Tractor, can highball at speeds up to 24.5 m.p.h. Its long-lived Caterpillar Diesel Engine delivers an honest 115 HP, on inexpensive No. 2 furnace oil. This rugged team is built to stay on the job without tinkering. Beefed-up construction and high-quality Caterpillar manufacture mean that it can earn you profits for years to come.

Your Caterpillar Dealer will gladly demonstrate the fast-hauling tractor and scraper that fit your needs. And you can rely on him for after-sales service and genuine factory parts. Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Advertisers

IN THIS ISSUE

Allis-Chalmers Mfg. Co. 12-13
American Manganese Steel Div.,
American Brake Shoe Co. 54

Bucyrus-Erie Co. ... Cover II, 53, 62-63, 73
Buda Co., The 11

Caterpillar Tractor Co. 2, 57, 75
Cover III
Cooper-Bessemer Corp., The 6

Detroit Diesel Engine Div.,
General Motors Corp. 43
Drake-Williams-Mount 48

Electric Steel Foundry Co. 42
Erie Steel Construction Co. 76
Euclid Road Machinery Co., The .. Cover IV

For Sale (Classified) 78
Foster, L. B., Co. 66
Freeman, Samuel T. & Co. 79

General Electric Co. 9
General Motors Corp.,
Detroit Diesel Engine Div. 43
Goodyear Tire & Rubber Co., The 1

Harnischfeger Corp. 77
Hayward Co., The 64
Hensley, Wm. D., Truck Parts 72
Hough Co., The Frank G. 49

International Harvester Co. 40-41

Jaeger Machine Co., The 4
C. S. Johnson Co. 68-69

Koehring Co. 68-69

LaCrosse Trailer Corp. 61
Leschen, A., & Sons Rope Co. 52
LeTourneau, R. G., Inc. .. 44-45, 46-47, 60

MacWhyte Co. 10
Marion Power Shovel Co. 55
M-R-S Manufacturing Company 50-51

Newman Manufacturing Co. 70
Nordberg Mfg. Co. 59
Northwest Engineering Co. 5

Rice Pump & Machine Co. 58
Rogers Bros. Corp. 65

Sauerman Bros., Inc. 71

Timken Roller Bearing Co., The 8

Wellman Engineering Co., The 67

Excavating Engineer

founded 1905

CONTENTS

Volume XLVII No. 4 **April, 1953**

Arizona's Rockiest Pipelining — by Ray Day 14
Eighteen miles of malapai and caliche rock make tough job tougher as El Paso Natural Gas Co. crews close last 50-mile gap in loop linking New Mexico fields with California.

Water Tower Goes for Ride 23
Confronted with problem of moving 1,900-ton water tower, British contractor used Diesel tractor to pull 80-ft. high concrete structure 300 yards over specially constructed track.

Blasting for Hire 24
All you have to do is get on the phone and U. O. MacDonald will come and blast 20 yards of rock in your back yard or thousands of yards of rock from a new road cut. Using modern equipment and methods, MacDonald has built his specialty into a hustling business in rocky New England.

Construction Machines Battle England's Flood — by Edmund Updale ... 32
In February, British contractors quickly moved in heavy equipment when sea and wind launched biggest blow in 600 years. Here's how they went to work.

They Share in Boston's Progress 36
J. Sullivan Sons periodically spreads indoor dirt blanket for Boston Garden audiences. It's only natural that Bostonians should look upon this contractor's work. They've been doing it for 65 years.

News from the Field 42

Truck Output High 42
Name Chairman 42
Name Reindollar Head of American Road Builders 42
Moles Honor Kiewit & Palmer .. 48
Inspectors Take Alaskan Refresher Course 48
Picture Mining Progress 52
Report Concrete Tests 52
Widen Quebec Canal for Power Needs 58

Obituary
J. B. McLellan 58

Equipment You Ought to Know About 56

Not in the Contract 74

New Trade Literature 76

Notes from the Manufacturers 80

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10″ Jaeger lifts creek over 30′ bank

Replacing 3 ordinary 6″ pumps previously operated 24 hours a day, one 10″ Jaeger "Sure Prime" handled the entire impounded flow of this creek in only 14 hours a day.

The job was performed in a 30′ cut in a stream bed being stripped of coal by Ben Construction Co. of Pittsburgh, Pa.

This diesel-powered Jaeger operated for 8 months completely trouble-free, in all kinds of weather, which involved handling storm water as well as normal creek flow.

Note volume of discharge at a point 100′ from intake and 30′ higher.

Jaeger Pumps pull stronger and pump longer because they are built oversize with larger shells and impellers, have two priming actions, and are generously powered with engines of the highest horsepower applicable. Prime without vapor lock, sustain efficiency on non-stop pumping, and give thousands of hours more service from pumps and engines.

Dewatering Pumps to 10″ • Pressure Pumps to 275 lbs.

See your Jaeger distributor or send for Catalog P-10.

THE JAEGER MACHINE COMPANY

553 Dublin Avenue, Columbus 16, Ohio

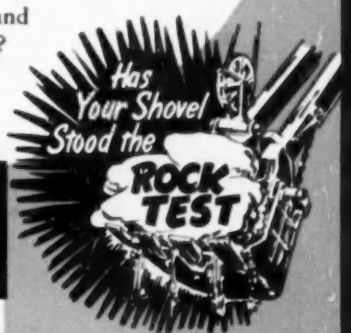
AIR COMPRESSORS • CONCRETE MIXERS • TRUCK MIXERS • PAVING MACHINERY

For the people whose business is ROCK!

The pictures on this page are typical of Northwest Shovels that are repeat orders in the hands of people whose business is Rock. Each one of these companies has tested Northwest machines continuously in their own rock. They have proved Northwest as a Rock Shovel. They have learned the value of the Northwest Dual Independent Crowd—the crowd that utilizes force most other shovels waste. They have found out what it means to have ease of operation without the complications of pumps, valves and other delicate mechanisms. They have seen the smoother operation and freedom from jerks and grabs characteristic of Northwest Uniform Pressure Swing Clutches. They know what the Cushion Clutch means with its ability to eliminate shock overloads before those overloads can do damage to the machinery. In short, they have proved Northwest advantages to be money makers worth having.

Now is the time to plan to be a Northwest Owner. Now is the time to check into and learn about Northwest. Why not talk to a Northwest Man and get the whole story?

NORTHWEST ENGINEERING COMPANY
1506 Field Building • 135 South LaSalle Street, Chicago 3, Illinois

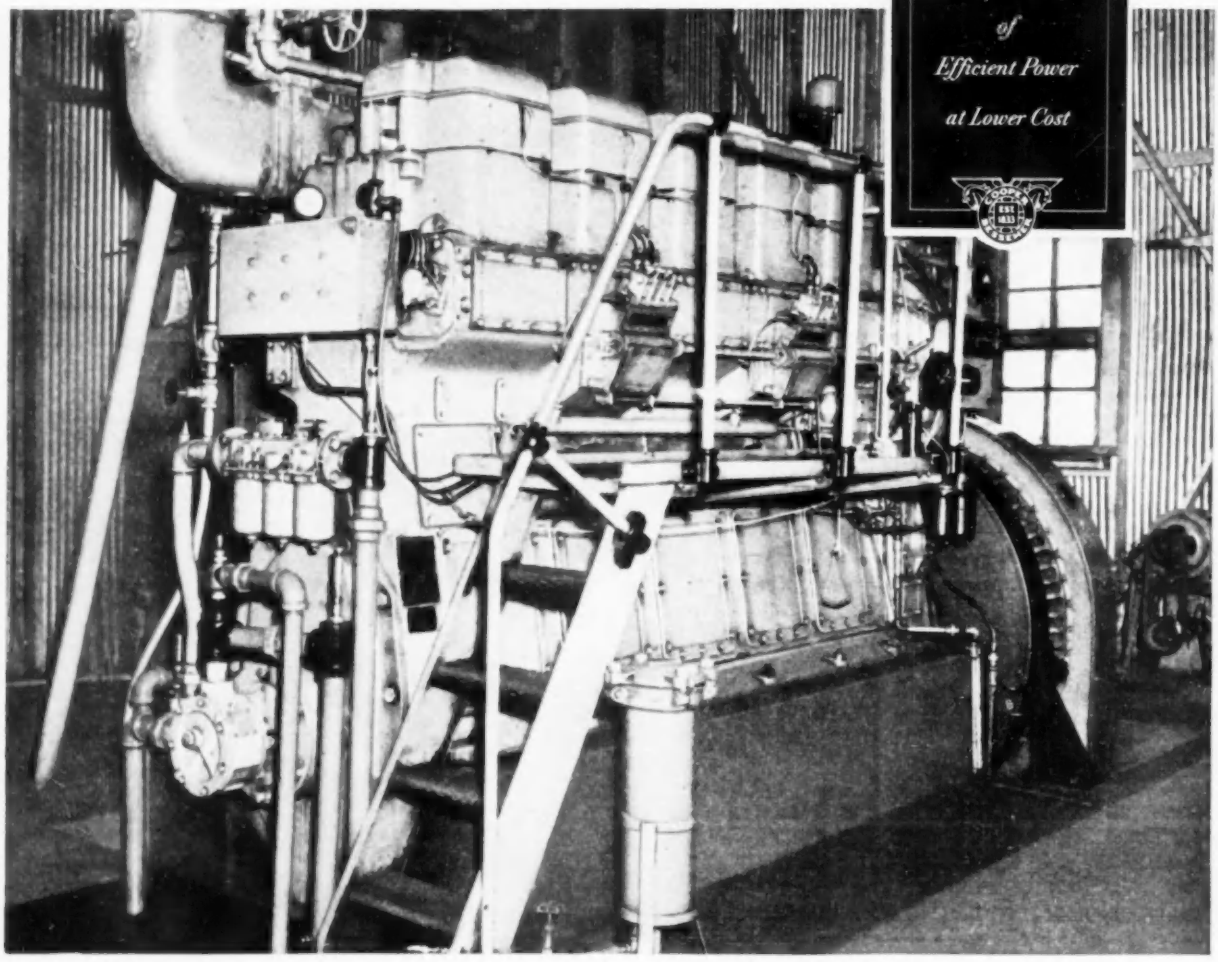


NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Installed at Uvalde Rock Asphalt Company's quarry, Blewett, Texas, this 430 hp Cooper-Bessemer JS-5 diesel drives a 300 kw generator for general power requirements.

Another Example of Efficient Power at Lower Cost



Steady worker, good at keeping costs DOWN!

THE Uvalde Rock Asphalt Company, which produces about 500,000 tons of limestone rock asphalt a year, needed a diesel that would stand up to steady work month in, month out. And that's just what they have in the Cooper-Bessemer JS-5 shown above. This efficient, husky diesel, installed in 1946, has done a steady job right from its initial start, with a very minimum of attention and replacement parts. Like other Cooper-Bessemer engine types, larger and smaller, the JS consistently shows records of low-cost operation. It has all the Cooper-Bessemer features that pay off every time.

The **Cooper-Bessemer** *Corporation*

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

"Every dollar --double duty..."

HARVEY S. FIRESTONE, JR.
Chairman, The Firestone Tire and Rubber Company

"Every dollar invested in U.S. Defense Bonds does double duty. Through the Payroll Savings Plan we help in the building of national defense and, at the same time, provide for personal security in the years to come. The Firestone organization is proud that more than 29,000 of our employees are participating in the Payroll Savings Plan."

Do America's wage earners appreciate that double duty feature of Defense Bonds? Let's take a quick look at a few figures:

- 7,500,000 employed men and women are investing *one hundred and fifty million dollars per month* in Defense Bonds through the Payroll Savings Plan.
- The number of Payroll Savers is going up steadily.
- In the first six months of this year, sales of Series E $25 and $50 Bonds—the payroll savers' sizes—totaled 33,946,000 pieces—an increase of 22% over the corresponding period of 1951.
- Sales of E Bonds in January-June, 1952 totaled $1,715 million—5% more than in the same period of 1951. (The Payroll Savings Plan is the backbone of E Bond sales.)
- Today Americans hold a cash value of more than $49 billion in Savings Bonds. Their holdings of E Bonds—the Series bought by Payroll Savers—are now $35 billion—$5 billion greater than at the end of the war.

What are *you* doing to help *your* employees build for national defense and personal security?

If you have a Payroll Savings Plan, and participation is less than 50%, conduct a person-to-person canvass of employees of your plants and offices. Make sure that a Payroll Application Blank is placed in the hands of every employee. He or she will do the rest. Participation in your Plan will jump to 60%, 70%—even higher, as it has in hundreds and hundreds of plants that have conducted similar canvasses.

If you do not have the Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will help you to install the Plan—or to conduct a person-to-person canvass.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

New Heiliner scraper travels 25 mph fully loaded . . *has 22 TIMKEN® bearings to help*

THIS is the latest model 2C500 Heiliner similar to those purchased by the U. S. Army Corps of Engineers in 1952. The unit is equipped with a 13 cubic yard scraper, and features Hydro-Steer, unobstructed visibility, and speeds up to 25 miles per hour—even when loaded!

To insure rugged dependability under the severest kinds of service, Heil uses a total of 22 Timken® bearings in the scraper's vital parts. In the differential, engine shaft and pinion, Timken bearings assure accurate gear meshing, reduce wear. That's because the tapered construction of Timken bearings enables them to take radial and thrust loads in any combination. Shafts are held in positive alignment, a smooth flow of power is insured.

Timken bearings on the scraper wheels are more than a match for heavy shock loads. Line contact between rollers and races of Timken bearings provides load-carrying capacity to spare. Bearings are case-hardened to give them tough, shock-resistant cores and hard, wear-resistant surfaces. Timken bearings are also used in the scraper's power control unit, and hydraulic pump.

Because they keep housings and shafts concentric, Timken bearings make closures more effective. Lubricant stays in—dirt stays out.

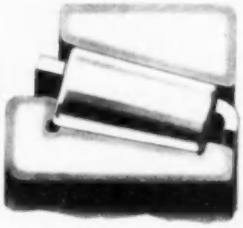
No other bearing can give you all the advantages you get with Timken bearings. Make sure they're in the equipment you build or buy. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED — *This symbol on a product means its bearings are the best.*

HOW **HEIL COMPANY** mounts pinion and differential of its 2C500 Heiliner on Timken tapered roller bearings to insure dependability, and long life.

TIMKEN

TAPERED ROLLER BEARINGS



HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

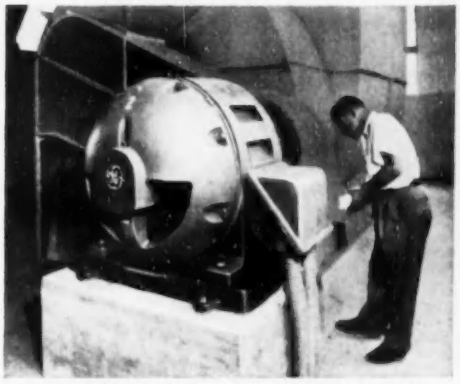
The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▷ BEARING TAKES RADIAL ◇ AND THRUST ⊣⊢ LOADS OR ANY COMBINATION

ENGINEERING REPORTS:

OPERATING ECONOMY for the new G-E equipped Norfolk-Portsmouth tunnel is provided by its variable-intensity fluorescent lighting system, Tri-Clad* ventilating-fan motors, centralized control, and reliable power supply.

G-E FLUORESCENT LIGHTING provides safer, more uniform, shadowless illumination. To avoid light-blindness at portals, intensity is increased during bright sunlight periods.



VENTILATION is provided by four exhaust fans, each driven by a G-E 2-speed, 250/40-hp motor. Motors run at high speed only in emergencies.

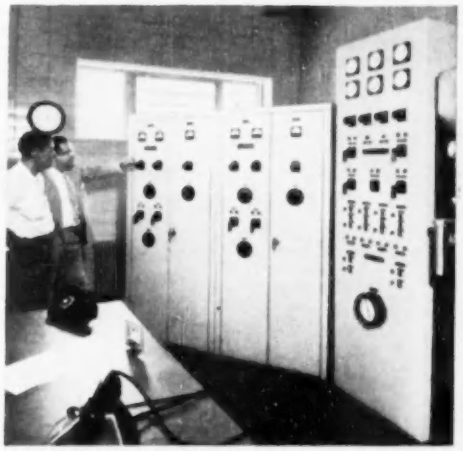
Continuous lines of light increase safety of new tunnel

G-E electrical system for Norfolk-Portsmouth Tunnel also features one-man control, reliable power supply

An outstanding feature of the 3350-foot tunnel, recently built beneath the Elizabeth River as part of a bridge-tunnel project linking Norfolk and Portsmouth, Va., is the electrical system that helps handle heavy traffic with greater safety and economy. The electrical equipment was designed by General Electric engineers working closely with the Elizabeth River Bridge Tunnel Commission, its consultants, Parsons, Brinckerhoff, Hall & Macdonald, who designed the system, and its contractor, Merritt-Chapman & Scott.

Let G-E engineers help your engineers or consultants on electric equipment for heavy construction projects. Contact your local G-E Apparatus Sales Office early in the planning stage. General Electric Company, Schenectady 5, N. Y.

*Reg. trade-mark of General Electric Co. 664-27



ONE-MAN OPERATION is a key feature of this main control panel from which lighting, ventilation, and two G-E unit substations are controlled.

Engineered Electrical Systems for Heavy Construction

GENERAL ELECTRIC

Macwhyte 6x25F PREformed Monarch Whyte Strand Wire Rope with I. W. R. C.

How many moving parts?

- In this particular rope construction there are 199 individual wires. Each is a carefully designed "moving part."
- Outside wires are one size. Inside wires are another size. Core and filler wires are still other sizes.
- Altogether, 8 different sizes of wire are used, and each has a specified strength, toughness and flexibility.
- Macwhyte has specialized in the manufacture of wire rope like this for over half a century.
- To assure highest quality, all stages of wire manufacture and rope fabrication are closely controlled.
- An exact "breathing space" between each wire is provided in order to increase flexibility.
- Each wire is protected with a film of lubricant that is force-fed *cold* during the fabricating.
- Since any piece of wire rope is a complicated piece of machinery, precision is as important in its manufacture as in the making of a fine watch.
- In designing and manufacturing its thousand and one wire ropes, Macwhyte exercises all the special care that assures long service and low cost to you. May our engineers recommend the right rope for *your* equipment?

MACWHYTE WIRE ROPE

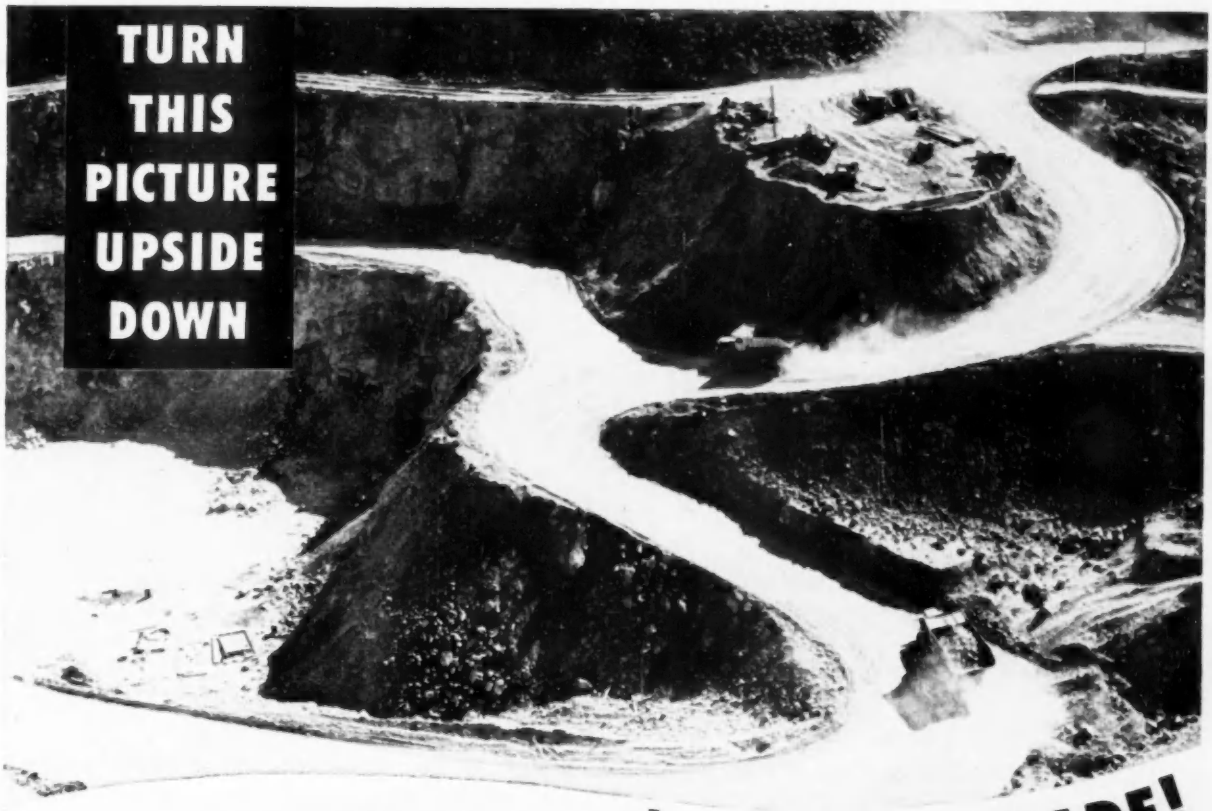
THE RIGHT ROPE FOR YOUR EQUIPMENT

Ask for G-15 Handbook

1032

MACWHYTE COMPANY

2903 *Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.*



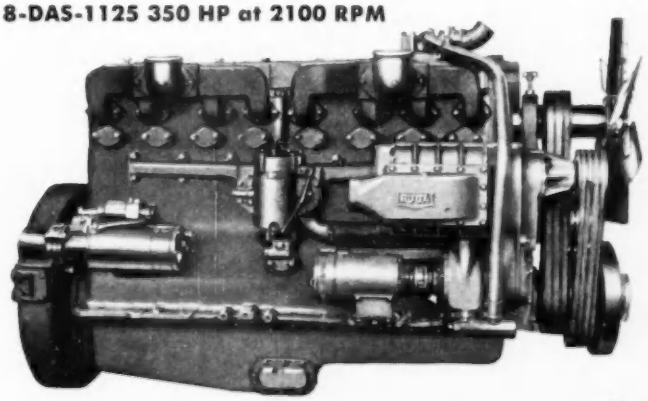
Any way you look at it... IT'S A TOUGH GRADE!

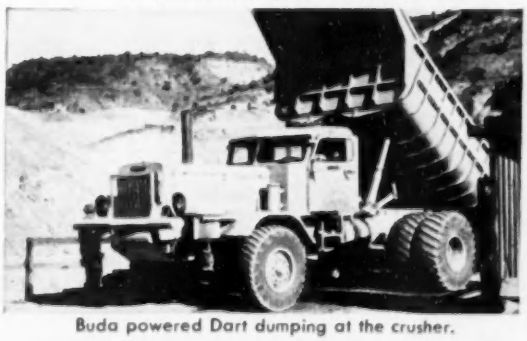
yet BIG BUDA diesels are cutting haulage costs every day!

14 Buda-powered haulage units are roaring up this tough grade . . . 2/10 of a mile with 5 switchback turns . . . hauling payloads up to 22 tons in faster time at a considerable reduction of their former cost.

The extra horsepower and 13 to 25% more displacement . . . greater lugging ability with 9 to 23% more torque of BIG Buda Diesels is paying off at this Bagdad Copper Corp. pit in higher production and lower costs. In many instances, the Budas are going more than 6000 hrs. before overhaul—another factor in lowered costs.

8-DAS-1125 350 HP at 2100 RPM





Buda powered Dart dumping at the crusher.

BC-18

Whatever your power requirements, there's a money-making Buda dyna-swirl Diesel to fit your needs. See your nearby Buda Distributor today. Write for Bulletins and data. *The Buda Company, Harvey, Ill.*

BUDA

Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment

Advertisement

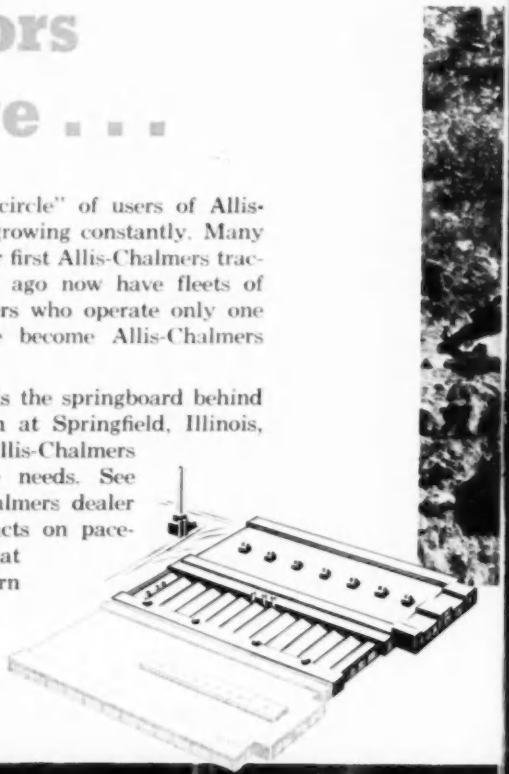
There's more to tractors than meets the eye . . .

The real "pay-off" value of any tractor to its owner is how it measures up to the standards set by today's modern production methods.

To meet these needs, Allis-Chalmers started from scratch and built *a line of tractors with a future.* Thousands now have been tested and proved on the toughest proving ground of them all, actual jobs, and they have more than measured up to expectations. Owners have found that these tractors set new standards of performance . . . that they give greater output with less down time . . . plus more profit, whether pulling, pushing, digging or dozing. Operators have discovered new ease and comfort in operation, too; and mechanics say these are the easiest-to-service tractors that they have ever worked on.

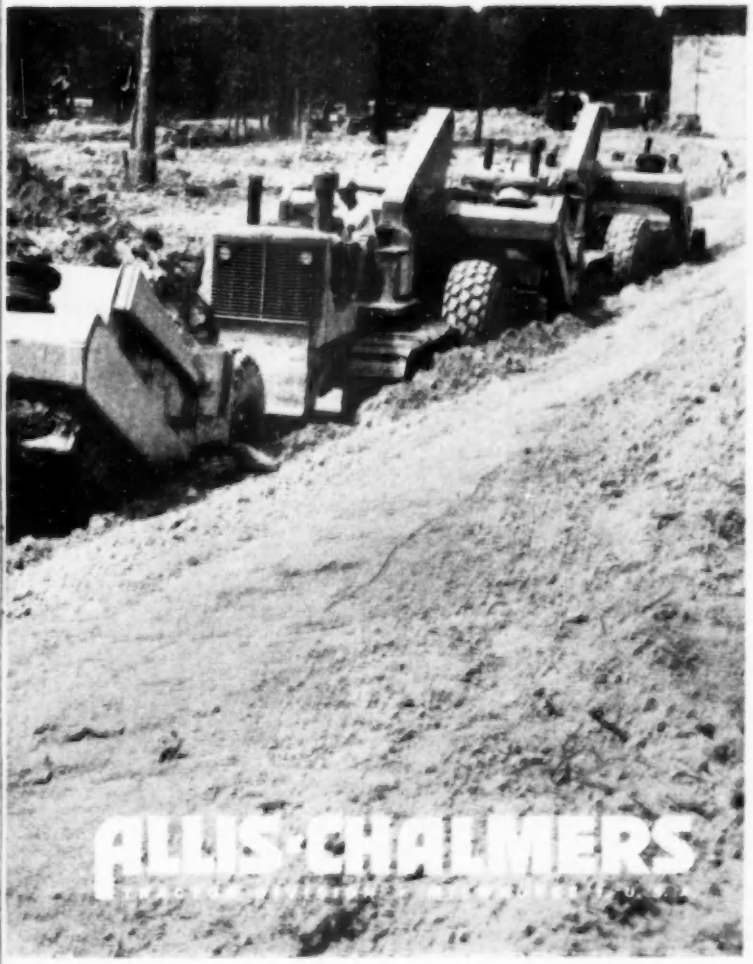
Yes, the "family circle" of users of Allis-Chalmers tractors is growing constantly. Many users who bought their first Allis-Chalmers tractor only a few years ago now have fleets of them, and many others who operate only one or two tractors have become Allis-Chalmers boosters.

This acceptance is the springboard behind a big plant expansion at Springfield, Illinois, which will enable Allis-Chalmers to meet *your* future needs. See your nearby Allis-Chalmers dealer now for the inside facts on pace-setting tractors that measure up to modern production methods.



From haul road to highway to heavy construction . . . wherever big production is essential to the job, this big HD-15 has more than proved its worth. With 109 drawbar hp. and 27,850 lb. weight, it works quickly, efficiently as a dozer, tractor-shovel, puller or pusher.

This 72 drawbar hp., 18,800-lb. HD-9 is making friends in every field because its power and weight make it ideal for dozens of today's jobs. And, operators can gain up to 25 percent more production on short dozing jobs because they can go from any forward to any reverse speed with just one shift.



The 40 drawbar hp., 11,250-lb. HD-5 is a versatile jack-of-all-trades for fleet owners as well as one-man operations . . . with hydraulically controlled Tracto-Shovel, it's equally useful loading bulk materials, dozing, digging basements, dozens of other jobs.

Here's real tractor teamwork . . . four HD-20's in a "train" — three pulling scrapers, one pushing — all working together for big production. With torque converter drive, they synchronize speeds at contact . . . automatically load at the fastest speed that job conditions permit, with less strain on operators and equipment. With 175 engine hp. and 41,000 lb. weight, the HD-20 is today's new yardstick of crawler tractor performance.

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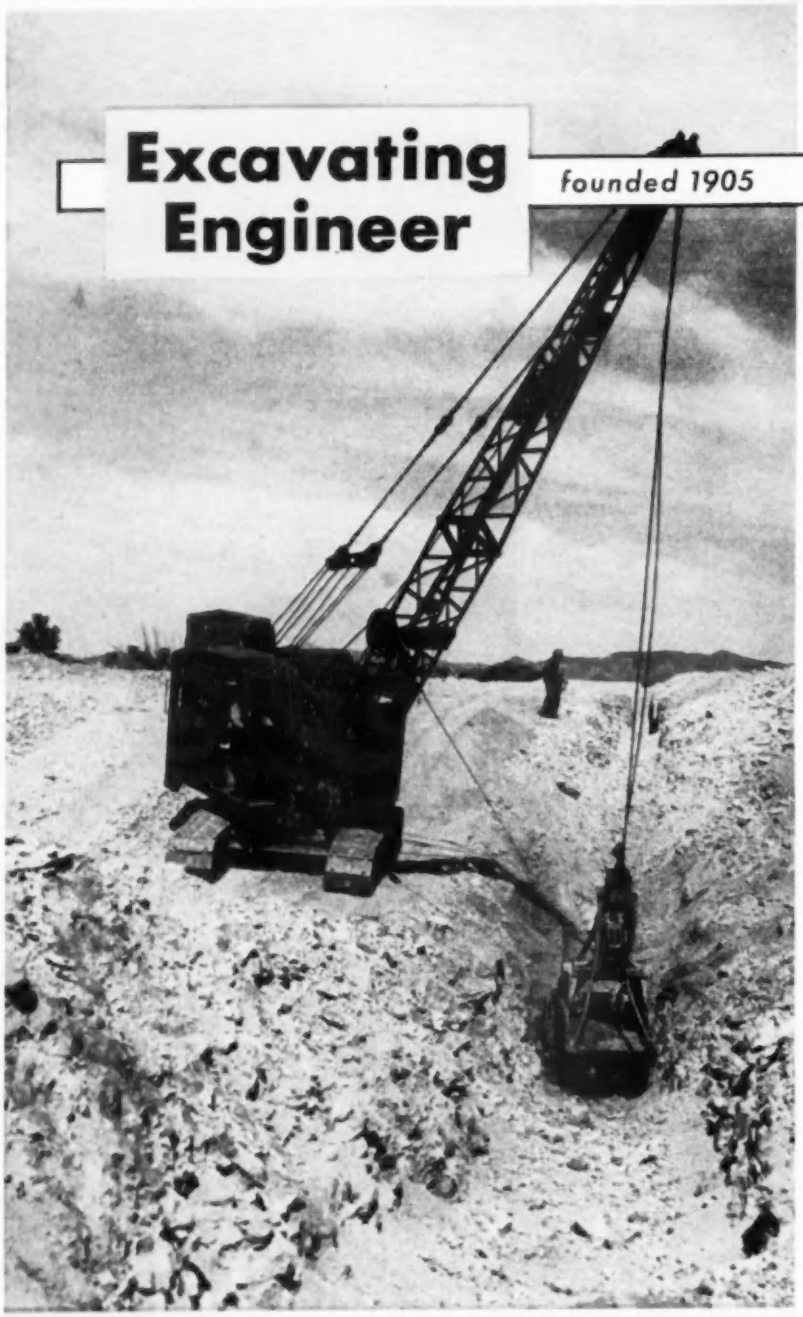


• High bottom left in trench bottom after blasting and excavation was re-drilled, blasted and lifted out with Bucyrus-Erie 22-B clamshell.

Arizona's Rockiest Pipelining

by Ray Day

Eighteen miles of malapai and caliche rock make tough job tougher as El Paso Natural Gas Co. crews close last 50-mile gap in loop linking New Mexico fields with California.

WEST of Kingman, Ariz., where malapai formations stick out of mountainous terrain, crews of the El Paso Natural Gas Co. have forged another pipeline link to hook New Mexico's natural gas fields to users in far-off California. Once before, three years ago, the company built a pipeline over the same route, so it came as no surprise when rocky formations stood in the way. Men who were on that job, however, swear that the rock has somehow gotten harder.

What El Paso Natural Gas Co. crews have been fighting is the last 50-mile link of a 30-in. steel gas line which will complete the loop from San Juan County, N. M. to the Colorado River crossing at Topock, Calif. The main line on this route originates near Blanco and Barker Dome in northwestern New Mexico, drops southwesterly to Gallup, and then heads in a general westerly direction to Kingman, Arizona, by way of Navajo Station, Flagstaff, Williams, and Ashfork. The 50-mile section now completed will hook the loop line together between Topock and Kingman. At the Topock bridge, a 34-in. "Super Inch" delivery line built by Pacific Gas & Electric Co. heads northwest toward San Francisco and the Bay Area. Farther south, another El Paso Natural Gas Co. line crosses at Blythe, Calif. to deliver gas to Los Angeles and the counties in the southern part of the state.

Typical El Paso Job

The Kingman-Topock job, with its rocky path and mountainous terrain, typifies numerous jobs the company has done in the past decade in its enormous expansion program. Men on the Kingman job helped to bring pipelines down the mountainside at 8,200-ft. Mt. Guadalupe, the highest point in Texas. And while many of the problems were tough, they were not exclusive to Arizona, for many of the pipeline stiffs had battled many of the same headaches before. The Kingman-Topock route was so difficult, however, that if this line is ever expanded in the future it appears likely that a different routing will be arranged to bypass the tough part.

Over the years, construction crews

• Top left: Outriggered Gardner-Denver drill gets air from Jaeger compressor as it sinks blast holes. Set-up is mounted on White half-track. Top right: Office Manager Wayne Harris and Powder Foreman Leo Stanley show how reels and measuring stops mounted on Ford F-6 powder truck helped speed fuse cutting.

of El Paso Natural Gas Co. have developed a pipelining organization capable of rolling across country at between one and two miles per day. Such an organization was set up at Kingman, and although certain modifications had to be made to meet a delay in the issuance of a public lands crossing permit by the US Department of the Interior, the scheme was fairly constant.

Organization-wise, the construction program started off with a small clearing crew, which knocked down the desert growth and roughed out an access road. Ditch excavation came next, followed by delivery of pipe, pipe bending, initial pipe lineup work, welding, "doping" (or pipe protection), pipe lowering, backfill, and cleanup. It is typical of the smoothness of the organization to find all these construction phases closed up within a space of about four miles.

The Kingman-Topock job was scheduled to start on the Kingman end and work southwest toward Topock. Because of the Interior Dept. permit delay, however, work was done near Kingman simultaneously with pipeline work in the Colorado River lowlands near the Topock end. And the 18-mile rock portion was sufficiently tough so that crews started there in December 1952—a month ahead of the main force—to get the trench roughed out ahead of the pipeliners.

• Above: Buckeye 48 ditcher which handled the routine part of the rocky pipeline job was traveling six feet per minute when this picture was taken. Below: An Insley K-12 backhoe takes blasted rock out of the trench.

Clearing Starts Construction

Clearing on the Kingman-Topock link consisted of removing yucca trees, cactus, and other forms of desert shrubs, and of roughing in an access road so pipeline delivery trucks and other construction vehicles could get

• One of critical parts of job is bending 30-in. pipe handled by Crutcher-Rolfs-Cummings pipe bending machine. An International TD-18 crawler swings Superior side-boom to position pipe in International-powered bender.

in. The line lay generally in a straight line, so that it was necessary to pass up and down hilly terrain and often around short curves. One 60-ft. pipe joint, for example, had four bends up to 27°, and not one in the same direction.

Initial clearing was roughed in by an International TD-24 tractor with a Bucyrus-Erie cable-controlled dozer, along with a Caterpillar D8 with a Caterpillar dozer. As these machines worked along the right-of-way, they knocked down all surface trees and other vegetation and piled the brush in convenient heaps. When the brush piles had dried a few days, they were burned to ashes to get rid of this material.

At the same time, the uneven ground was smoothed out by the dozers to establish a 20-ft. access road. In places vulnerable to flash floods, necessary embankments were built up to deflect the runoff water. In some cases short drainage channels were also shaped. When the dozers finished roughing in the access road, it was shaped to final section by a new Adams 610 motor grader, which drifted cohesive fine material into place to bind the coarser rocks together and make a fairly durable surface. During the construction period, this road was maintained at frequent intervals by the Adams grader. The road was usually passable.

Generally speaking, clearing stayed out ahead of the other operations by at least three miles, so that ample room would be prepared to make way for construction work to follow.

Pipe Trucked to Site

The steel pipeline was fabricated at two places: In the Gadsden, Ala., plant of Republic Steel Corp. and at the Vernon, Calif., plant of Consolidated Western Steel Corp. The line was rolled in 30-ft. joints at both plants, and shipped by rail to sidings in Kingman, Yucca, and Topock, Ariz. Pipeline walls were from .324 to .335-in. thick to resist the 700-lb. psi operating pressure which will be in the line.

At the rail sidings, the line stringing job was taken over by Dunn Bros., Inc. of Dallas, Tex., specialists in that type of work. A fleet of eight International trucks shuttled back and forth between the rail sidings and the laying area to deliver and string the sections out ahead of the crews. Care was used especially in the pipe unloading operation, because even with .335-in. steel walls, pipe ends tend to become egg-shaped when abused, and then the make-up problem is enormously complicated for the welding crew. By using common sense care during this operation, considerable delay and trouble later on was averted.

Arizona's Toughest Trenching

Excavation of the pipeline ditch called for some of the toughest trenching work many of the men have seen,

• This 60-ft. bend will fit a tricky curve over the top of a mountain saddle, and train the line down the next slope.

and while some of the problems may have been equalled, few have been exceeded.

Plans called generally for a ditch 60 inches deep, with a 44-in. bottom and slopes sufficiently great to prevent excessive raveling. Directly west of Kingman, an 18-mile stretch of malapai—the west's toughest formation—lay in the way. The malapai was mixed up with softer forms of rock such as caliche, granite, and diorite. It was obvious from the start that a sizable drilling and shooting job was indicated.

The drilling fleet was unusually mobile. It consisted of eight Gardner-Denver and Ingersoll-Rand wagon drills side-mounted on outriggers on White halftracks, with an Ingersoll-Rand, Gardner-Denver, or Jaeger air compressor of 210-cfm size mounted on the same halftrack. There were also two Gardner-Denver twin drills on the job, mounted on International TD-18 tractors. Each of these machines was equipped with Timken steel in lengths up to 12 feet, with Timken tungsten-carbide bits capable of bottoming holes at 2½-in. diameter.

In the solid malapai formations drilling was particularly discouraging. When this formation was first encountered, a driller was using an ordinary rock bit left over from a previous job. When he stuck the bit down against the malapai ledge, there was a burring sound and the smell of metal burning. When he pulled up the steel the bit was practically burned to a crisp. Tungsten carbide bits were then substituted with good results, but in hard malapai even these bits were wore down in from only 15 to 80 feet of hole. In caliche or some of the softer formations, the same bits often delivered up to 800 feet of hole at much greater drilling speed.

Drill holes in solid rock formations were put down at the edge of the ditch line, 40 inches apart. In these solid formations a row of holes was placed along each edge, and the 40-in. spacing was staggered to increase the explosive effect of the double row of holes. In partially seamed or cracked rock formations, the drilling pattern

• Top: Line-up crew joins sections with stringer bead. Cat, first, and International, second, tractors swing pipes in place with side booms. Right: A three-bead topping completes the welding job. Twelve Lincoln welders were used for the final joining. Below: Trickiest part of cleaning process was to get the cleaning and enameling machine clean after a day's run.

• Left: It was his baby. Pipeline Superintendent J. A. Smith said the 18-mile malapai section was one of worst pipeline conditions he ever encountered.

• Right: Sand cushion used in pipeline trench under extremely rocky conditions was dug by this ¾-yd. Bucyrus-Erie 22-B shovel. Operator worked most of the time against a 0 face.

consisted of a single row of holes on 24-in. centers down the center line of the ditch.

Caprock Problem

Rock formations were found to vary greatly. In many cases a solid rock cap lay perhaps four feet deep over the surface of the ground, with an underlay of gravel or sand. Such formations are typical of lava-flow country, but they make things difficult for drillers and excavating crews who have to dig the material. The drilling crew soon found a way to handle such types of caprock formations. They simply stopped drilling as soon as the bit dripped out of the caprock, and every four holes or so they drilled a hole to full depth just to make certain no high bottom rock formations were showing up.

In other places, the surface of the ground might be sandy or granular, but just beneath lay a rocky ledge. In these cases the drill holes were sent down usually 18 inches below grade line, so the explosive force would loosen the formation as effectively as possible. And even so, it was necessary later on to have a small compressor and a jackhammer and "dobie" squad pass by to pick off any high outcrops missed by the preliminary excavation crew.

The Kingman malapai was peculiarly shot through with voids and blow holes, so that its texture resembled pecky cypress wood more than anything else. In spite of this open texture, however, it was easily the worst drilling rock on the project. And after the holes were drilled, it presented the toughest powder handling problem because of those same blow holes which all too often let most of the explosive force absorb or escape altogether.

Use Slow Powder

In spite of the difficulty of drilling malapai, however, it responded better to slow-burning than faster explosives. High velocity gelatin, for example, is practically worthless in this formation. Powder men learned very soon to column load each hole with 40% Apache bag powder. In relatively full-depth rock, the holes were loaded to within two feet of the surface and stemmed with tamped dirt.

Some unusually efficient features were worked out in connection with this part of the work. Delivery of explosives to the job was one example. The company purchased all powder and caps from Border Machinery Co. of El Paso. As part of its delivery service, Border Machinery Co. picked up a load of powder at the Apache manufacturing works at Benson, Ariz., and delivered it by tractor and semi-trailer to the job site. At this point the tractor unhitched, leaving the load of explosives parked off the right of way site in a safe place. A smaller shed was provided for storage of caps and detonating fuse. When a load of powder was almost gone, Border Machinery Co. sent another load out to the job and picked up the empty semi which had been used for storage.

A second ultra-efficient kink consisted of a Ford F-6 truck especially fixed up for powder handling. It had a flat bed protected by a low guard-rail for handling explosives and caps. On each side of the cab special reels were mounted to carry both Primacord and ordinary fuse. On one edge of the truck bed a measuring stop and a 7-ft. marker were provided, so that detonating fuses could be cut to exact dimension. This specially rigged truck boosted loading production of the powder crew by an estimated 40% to say nothing of its contribution to blasting efficiency and general safety.

Rig 7-ft. Fuse

On big shots in solid rock formations, each hole was rigged with a 7-ft. fuse and an ordinary blasting cap. These holes were never loaded until the drilling crew was safely out ahead. When about 50 holes were loaded, the fuses were lighted progressively in one operation. The resulting blast had the effect of a progressive series of delays, and when the material broke out progressively against previously blasted material, it

• Above: A pair of International TD-24's with Superior side booms lower-in the 30-in. steel pipe. Pumps take water from ditch. Below: A pair of Caterpillar D8's doze in backfill.

tended to develop excellent fragmentation, even in the stubborn malapai.

Softer formations, such as caliche, were shot often several thousand feet at a time. These holes were similarly loaded with bag powder, and each hole was equipped with a short length of Primacord detonating fuse. Each hole was hooked by its fuse to a Primacord trunk line, and the whole works was set off by a short cap and fuse.

Electric blasting caps and blasting machines were not used. El Paso Natural Gas Co. uses Motorola two-way transmitting sets all over its spreads, and the Kingman job was no exception. Because of several isolated instances of accidental explosions of electric blasting caps in other parts of the country, believed traceable to electric impulses from nearby radio sending sets, the use of electric blasting caps has been fairly well outlawed on pipeline spreads of this company. Large scale blasting can be done about as easily with Primacord.

Hoes Excavate Ditch

Broken rock loosened by the powder shots was leveled off by a pass with a dozer, and then a fleet of five Insley K-12 backhoes removed the material. Working on level ground, uphill and downhill on grades as steep as 20%, these machines removed the rock and cast it to one side. A narrow berm was left to prevent too

much excavated material from rolling back into the ditch.

The ragged, broken bottom of the rocky ditch was hardly suited to the installation of a permanent high-pressure pipeline, however, because of the danger to pipe walls from damage to the protective coating as well as bridging stresses. Before the pipe could be laid in the ditch, considerable extra work was done.

A Bucyrus-Erie 22-B shovel was brought in and put to work in every sand pit along the way, loading out sand and dirt to a fleet of eight International and Chevrolet dump trucks. So rocky was the general area that sand or dirt pits were at a premium, and most of the country was covered with Jeep tracks where officials had scouted in search of the material. The loads were brought in along the side of the ditch where the pipeline sections lay, ready to be assembled. A small labor crew made a finegrade by working in about three inches of this material.

In connection with this part of the operation, it was often necessary for them to remove rocky high bottoms and sloughed-in material from the ditch banks. The crew carried a small Ingersoll-Rand Jackhamer and a small compressor, along with a limited supply of dynamite and powder for "dobie" shooting or deeper drill shots. A Bucyrus-Erie 22-B machine rigged as a clam, carrying a ¾-yd. Williams bucket and a Rudomatic tagline, worked with this crew and mucked out excess material from the trench. When the finegrading crew had finished with its work, the ditch was true to line and grade and, barring a freak rainstorm or a high wind, was ready to take the pipeline.

An interesting part of the trench digging operation consisted of crossing US 66 halfway between Kingman and Topock. Some 400 feet of 34-in. pipe casing was laid here to carry the pipeline through the existing two-lane highway embankment and to provide future protection when this section is brought up to modern four-lane divided expressway standards. The 34-in. sleeve was laid in a tight fit through a hole augered through the embankment by a special Crose auger rig, powered by an International UD-6 industrial engine. The highway embankment was not disturbed at all by this work.

The remainder of the ditching project was the assignment drawn by a Buckeye Model 48 trenching machine.

• Assistant Superintendent Bill Page and Office Manager Wayne Harris exchange a few words in the desert between Kingman and Topock.

and the formation was anything but easy. Most of the remainder of the line lay in formations of sand, gravel, loose boulders, or halfway cemented sand rock. As added variety, a few rattlesnakes and an unfortunate skunk who slept one night under the conveyor discharge belt were thrown in for good measure.

With the exception of occasional removal of sloughed-in material from the ditch sides, this machine generally left a good bottom on which to lay the big pipeline.

Bending Crew Moves In

Of all the construction phases, none was more important than pipe bending. Because of mountainous terrain, a considerable part of the line called for everything from simple to complicated changes of direction, and only one machine—a CRC smooth bender powered by an International UD-9 Diesel engine—was available for this work. Because of the critical necessity for keeping the bending dependably ahead, the CRC bender often was so far ahead that its crew was often found at lunch time eating with operators on the excavating spread. Thus if anything on the machine

• Final dressing of the right-of-way was up to this Adams 610 motor grader. Third gear of the machine was invaluable for keeping the grader in motion through sand which was deep and treacherous.

needed repair, the necessary part could be flown out from Houston, Tex., in time to prevent a slowdown of other work.

All bends were staked by a survey crew, with the amount of deflection marked in degrees on the grade stakes. If complicated bends were needed on a section longer than 30 feet, two joints were welded together before the machine moved in. An International TD-18 tractor with a Superior side boom was used for pipe hoisting with this bending machine, and a Caterpillar D7 also saw some service. Bends up to 30° were made in some of the sections, and one dog-legged change of alignment saw four bends up to 27° all in a different direction, placed in a 60-ft. pipe.

In addition to the danger of buckling a pipe wall, bending crews were careful to make their bends in such a way that the pipe would readily pass the gas-pressure-driven cleaning tool which is passed through the line just before it is placed in service. This operation, which is known in pipeliner's language as "pushing a pig through the line," can be jeopardized if bends too sharp are made.

The CRC bending machine was equipped with a smooth anchor block curved to fit the pipe, and a cable-pulled lever block which delivered the enormous push necessary to bend the heavy steel pipe walls. The International engine which powered this rig was controlled from an operator's platform. Signals were given by the pipe bending foreman.

Lineup and Welding Crews Follow

Following in rapid succession at this point were the lineup and welding crews, each with well defined work to do. The lineup crew's job consisted of picking up the successive sections of pipe, fitting them together, and running the initial welding bead. An International TD-18 and a Caterpillar D7 tractor, both with side booms, are used for the hoisting part of this operation. While one machine picks up a section and holds it on line, the other moves ahead for the next section.

The stringer bead which forms the first joint weld is made with 5/32 Fleetweld rod, and the hot pass which follows in rapid order is also placed with this rod. Four Lincoln 300-ampere welding machines are used for this work. Mounted in pairs on small vehicles, they are drawn ahead as necessary by a TD-9 International tractor.

On top of the stringer and hot pass comes a three-bead topping, consisting of two fillers and a cap weld. These welds are made with Shieldarc 85 rod of 3/16-in. diameter, and are placed by 12 Lincoln 200-ampere machines.

Fabrication of the line in 30-ft. joints instead of the conventional doubled sections slowed down progress somewhat, but the rate of speed was in keeping with other features of the work—especially excavation—complicated by difficulties. Because of this, the next two phases alternated.

The final cleaning and protection of the pipe was the first of these next steps. A Model "C" CRC cleaning and priming machine, powered by an International UD-9 Diesel, moved in with three TD-18 side-boom tractors to assist in raising the pipe. This machine moved along under its own power and cleaned the pipeline thoroughly with its knives and steel brushes. Even a rusty pipe came out smooth and spotless. This machine also sprayed on a primer coat of Koppers bitumastic prime protection.

The dope machine was also a CRC

• El Paso Natural Gas Co. wanted to build up additional protection over the bottomland backfill, so they hauled extra material downhill with this Caterpillar scraper pulled by a D8.

rig, powered by a UD-4 International Diesel. It put on a coat of Koppers bitumastic enamel and dope, followed by a wrapping of glass paper. The coating is designed to protect the metal from rust, corrosion, or loss through electrolysis. Upon completion of the protective coating, the pipeline was left resting on timber cribbing until it could be lowered.

Pipe Lowering

Pipe lowering was usually done on alternate days, to fit the "dope gang's" schedule. Equipment for this consisted of two Caterpillar D8's with Trackson pipe layer side booms, and two International TD-24's with Superior side booms and heavy counterweights. Conventional lifting belts were used to prevent damage to the pipe covering, and the lifts were usually made rather rapidly and uneventfully. Pipe lowering was usually done as early in the day as possible to escape the effect of expansion when the sun began to warm up. More than one pipeline has jumped in the trench without help from any equipment, so every effort was made to prevent that kind of mishap here.

Backfill Finishes it Off

Placement of backfill, along with the final cleanup, was the last construction operation. A pair of Caterpillar D8's with Caterpillar dozer blades handled this step. The remaining select material left over from the leveling pad through the rocky section was dozed in first, to cover the pipe. Excavated rock was then shoved in. When the fill neared the top of the ground, repeated passes were made by the tractor crawler tracks to compact the backfill as much as possible. The remaining material was then neatly piled on top of the line location.

In addition to this, a final polish was put on by the Adams 610 motor grader. Final motor grader work often did many little things to help surface drainage and to leave a good service road along the line. Where the line passed through ranches or farms, every effort was made to leave the ground in shape to please the owner, and it turned out to be efficient public relations at its best.

Excellent equipment maintenance and repair facilities were provided, in spite of the mobility of the work. Two service trucks visited every machine during the idle night hours, to deliver fuel and grease. A headquarters shop for major repairs was set up at Kingman, and major service was taken care of at that point. An International LF-210 "West Coast Special" flat bed trailer and truck was used whenever tractors or other heavy equipment had to be moved from one spot to another.

A full time safety director was also assigned to the job. One of the most dangerous parts of a pipeline job where protective coating is applied in the field is the dope gang, and this job was no exception. Serious burns can come if 500-degree enamel splashes on unprotected skin, and men not used to enamel get bad surface burns from the fumes alone. It was a tribute to the efficiency of the safety program that no one was seriously burned on the dope gang.

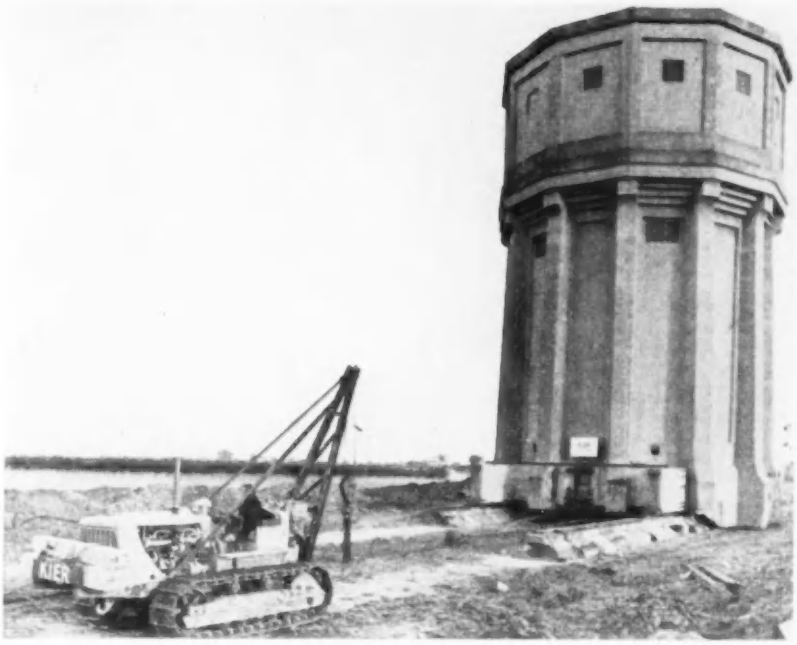
By having a safety director active in the field, the liaison between the crews and the policymaking level of the El Paso headquarters office was maintained at peak efficiency. There was a particularly fine feeling throughout the job toward the safety program, because pipeliners in remote country know that an ordinary accident, far away from a hospital, can be dangerous to themselves and their families.

Personnel

J. F. Eichelmann of the El Paso headquarters engineering office was in direct charge of all field operations covered at Kingman, with R. W. Harris as pipeline construction superintendent. Pipeline Superintendents were J. A. Smith and T. O. Norfleet. Key assistants included Assistant Superintendent Bill Page, Leo Stanley on drilling and blasting, Hardy Jones on welding, Albert Rising on bending, Lewis W. Orr on lineup work, Irving McLaughlin on pipeline protection, Al Cody on lowering-in, and Grady Wright on cleanup. Wayne Harris was Office Manager.

Completion of the Kingman-Topock link will make gas deliveries to California much more efficient by creating a vital storage reservoir for use during peak demand periods. And because of the many difficulties involved, pipeliners on the project are likely to speak with respect for years to come of Arizona's rockiest pipeline work.

● Intricate tie-in between new loop and main line was completed in three hours. Careful prefabrication of valves and tees halved allotted six hours for the job.



• Caterpillar D7 crawler tows 80-ft. high water tower along specially prepared track. Normal five-ton pull of D7, by means of block and tackle, was upped to about 50 tons.

Water Tower Goes for Ride

Confronted with problem of moving 1,900-ton water tower, British contractor used Diesel tractor to pull 80-ft. high concrete structure 300 yards over specially constructed track.

THE problem of moving a 1,900-ton water tower in England was solved when a Caterpillar D7 Diesel tractor was called on to pull the 80-ft. high concrete structure 300 yards over specially constructed track.

The proposed job was thrown into the lap of E. Ingerslev of J. L. Kier & Co., Ltd., engineering works contracting company, when it was decided that the tower, located in the Bedford Rural District Council area, would have to be moved to a new location or demolished.

Ingerslev's plan was to lay a concrete-based rail track down on which to pull a cradle bearing the tower. The D7 was equipped with a 10 to 1 block and tackle reduction which would enable the tractor's five-ton pull to exert a 50-ton pull. The projected scheme was estimated to cost about half as much as the cost of building a completely new tower at the new location.

The track consisted of continuous ball races made up of ordinary bull-head section railway lines laid on their sides one above the other. Between them were the bearings—about 800 2½-in. diameter steel balls.

The ball races were arranged in pairs, each pair supported by a line of precast concrete blocks six feet wide at the bottom and two feet wide at the top. These blocks spread the load over the full width of two concrete roads leading from the tower to the new site. The roads consisted of four-inch concrete on a hard core base rolled into the clay subsoil which had been previously cleared and levelled by the Caterpillar D7 and dozer.

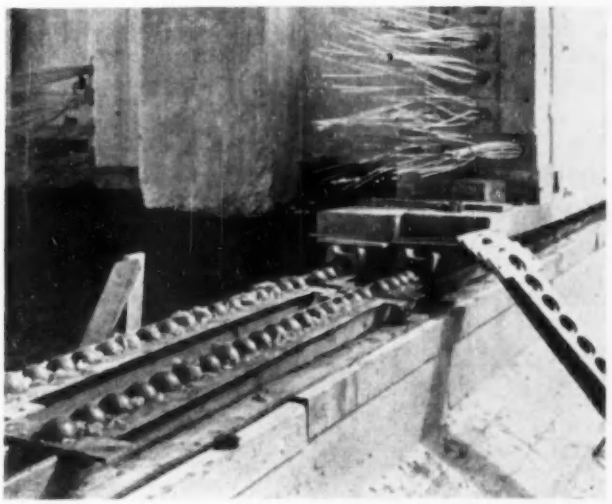
The first section of the track was built up around and through the base of the tower, the two-foot concrete walls being cut to allow the rails to pass through. A concrete cradle carrying the tower as it was hauled along the track, was made up of a series of pre-stressed concrete beams each six feet by two feet.

Where these beams went through the tower structure, only holes for the pre-stressed cable were bored through so that the tower itself formed part of the cradle.

When the cradle was finished and lying snugly on the track, eight of the tower's 12 supporting columns and the panel walls were cut away by blasting, leaving the tower supported by only four columns. These were then gradually cut away until the tower settled on the track.

In towing the tower, the D7 pulled through the block and tackle so that for each 10 feet the tower moved one foot. The track was arranged so that the tower could be moved about 50 feet in one haul. Then the D7 was unhitched and by means of a hoist attachment, picked up the rear blocks and laid them in their new position in front of the tower and replaced the track and ball races.

Working continuously in good and bad weather, the tower was over its new foundation four weeks after it was moved away from its former site.



• Standard bull-head railway line and 2½-in. steel balls provide four ball races upon which 1,900-ton tower was towed by tractor. Track was set on concrete blocks which were six feet wide at bottom and two feet wide at top.

• Top: One of the crew wires up 1½ by 8-in. Hercules dynamite sticks. Only small area is covered in each blast due to closeness of dwellings.

• Holes on 2½-ft. centers are loaded with two charges separated by stemming.

• Working with the truck crane, crewmen place three 12 by 14-ft. blasting mats over the area to be shot. Mats overlap to give maximum protection.

• The blast itself is anything but spectacular. A little smoke puff and a muffled explosion accompany the shot. There is no throw.

Blasting For Hire

All you have to do is get on the phone and U. O. MacDonald will come and blast 20 yards of rock in your back yard or thousands of yards of rock from a new road cut. Using modern equipment and methods, MacDonald has built his specialty into a hustling business in rocky New England.

IN THE hills around Boston, Mass., you would expect to find a contractor who earns a good living for himself and his employees by doing precision blasting. You would expect this because the locale creates a natural market for the talent.

The entire area rests on rock. Most of it is covered with a thin layer of topsoil, but in many places the bare rock crops out. You can seldom dig as short an excavation as a residential water connection without hitting tough rock before you finish.

To meet the demands of the rock-ribbed New England hills, a blaster must be able to deliver precision in a trade which is not famous for its close-tolerance results. A second regional characteristic lies behind the call for precision: A high density of civilization. The area differs from the wide open spaces of the Midwest and the still wider open spaces of the Far West. Buildings — houses, factories, stores—seem to be everywhere.

Careful placement of holes, cautious calculation of loads and absolute control of throw are requirements. Unless the contractor has become a perfectionist along these lines, he does not stand a very good chance of finishing up the year with a profit balance. His income will soon become outgo in defending lawsuits. He needs to be able to blast in the back yard of a city dwelling without damaging surrounding foundations and buildings.

A Specialist On The Scene

In the town of Braintree, one of the Bean City suburbs, you will find just such a contractor—U. O. MacDonald. His is a familiar and welcome name to New England contractors. He has helped keep many an excavation job on schedule by dispatching his specially skilled forces when a prime contractor has met rock. He is available for smashing a few yards of rock or for big quarry blasts.

MacDonald has been blasting for profit for the last 18 years. He became interested in the subject through a neighbor, a powder salesman who asked his help on occasion in staging demonstrations. He sold explosives, then gradually gravitated to the "use" end of the business. After the war, when the supply of industrial explosives again was assured, he entered the contract blasting business exclusively.

U. O. MacDonald himself is a cheerful, confident man with an abundance of energy. A quarter hour's acquaintanceship with him will leave anyone with the firm impression that here is a man who lives by the American code of life. An ever-alert mind, initiative and aggressiveness are characteristics which stand out. He is a practitioner of hard work, friendliness, and constant salesmanship.

The last of these qualities—salesmanship—is one which U. O. sees as a real essential for success in contracting. In the center of a Weymouth Landing parking lot, but still in the town of Braintree, MacDonald maintains a small, attractive office, windowed on three sides. It affords an excellent view of the passing scene. It is a view, however, that MacDonald enjoys for only a few minutes every day. Salesman that he is, he is constantly on the move, meeting people, watching his jobs, figuring on new ones—in short, selling his services.

It is this salesmanship which brings in the host of smaller jobs which keep the crews going. MacDonald takes on a lot of work for private home owners and for the town's sewer, water, and gas departments. He realizes that the market is broad where most of the sub-surface is rock; and he strives to keep in touch with as much of it as he can.

Small jobs have taken on more importance in late years. They have drawn him more and more into the excavating phase of the work. People and towns not only want rock broken, they want it excavated and hauled away.

Although MacDonald is a man in motion, he has kept himself excep-

tionally available. He is always within reach of a telephone. Inter-connected phones ring simultaneously in his house and his office and these, along with a mobile phone in his automobile, keep him "on tap" for consultation at all times.

A call to U. O. MacDonald on the mobile phone brought him into the office where we met him. He took us out to one of the smaller jobs—the result of salesmanship—and we had our first chance to see one of his crews at work.

MacDonald parked the car in front of a house on a tree-shaded residential street. We walked to the back yard where the crew was "digging" an excavation for a swimming pool. Actually, the digging part of the job was insignificant. Blasting was the major work item because this back yard was almost solid rock. Only a six to 12-in. topping of soil covered the mass of rock which lay below.

The 20-ft. by 40-ft. pool excavation was planned to be about four feet deep at one end and about five feet deep at the other end. When finished, the pool's concrete sides would rise above ground level. This construction would give the necessary water depth and cut down the amount of rock to be taken out.

A drilling crew had sunk holes on

• Top: A GMC flatbed truck brings blasting mats to the job site. Center: Bucyrus-Erie H-3 Hydrocrane takes mats from truck and places them over loaded holes. Bottom: When not handling mats, truck crane is equipped with hydraulically-actuated clamshell bucket.

2½-ft. centers throughout the area. Following their standard procedure, the MacDonald crew sunk the holes one foot below final grade. They have found that the extra foot eliminates knobs on the floor of an excavation.

Holes are tapered on most of the work the firm does. Usually, the first 18 inches of steel will put down a 2½-in. hole; next a 4-ft. steel will sink a slightly smaller hole; finally a 6-ft. steel will bottom at ⅝-in. Changing drill steel size avoids hanging steel in the hole. Of course, the pattern of steels used will vary with the depth and size of hole needed.

The drilling gang uses air-powered equipment to sink blast holes. Compressors are Jaegers, five in all. There are three 105's, a 210, and a 315. Operating off these are 15 Thor jackhammers, two Ingersoll-Rand wagon drills, and an Ingersoll-Rand wagon jack with a J-50 pneumatic hammer.

Blasting mats play an important part in MacDonald's method. A GMC platform truck brought a set of three mats in to the swimming pool job site. The mats are constructed of hand-woven ⅝-in. steel cable and measure 12 by 14 feet each. They weigh 3000 pounds apiece and MacDonald's blasting will use up three sets in a year.

A Bucyrus-Erie H-3 Hydrocrane unloads the mats one at a time with a hitch attached to a corner of the mat. The three mats are placed flat over the holes which are to be detonated. As extra precaution, the mats overlap each other.

Load Holes

Before the mats are positioned, holes have been loaded and partially wired. On the swimming pool job, six to eight holes were being fired at a time. These were loaded with two charges, separated by stemming. For this type of blasting, MacDonald prefers a 1½-in. by 8-in. charge although in quarry work he uses a 5-in. by 24-in. charge. He supplies his blasters with 40% dynamite sticks because he feels that this strength gives better distribution in the hole. He feels that either 40 or 60% will work out well for these jobs, but prefers the 40 himself. Hercules powder is used exclusively, brought from the firm's permanent magazine in West Quincy.

To transport explosive, MacDonald makes use of a special portable magazine, which was constructed in conformance with State of Massachusetts laws. The box was built of glued, 1½-in., dovetailed planking with a metal covering of not less than 26-gauge thickness. There is no metal on the inside of the box. It can be transported on the box of a pickup truck and deposited at a job site, freeing the truck for other jobs.

When the holes to be fired have been loaded, partly wired and covered with the mats, the wire is hooked into a blasting battery. Work stops momentarily. One man watches the area to see that no one is in danger. When he signals, another worker pushes the plunger which generates the detonating current. The blast is a peaceful occurrence. There is little noise, no throw, and a feeble puff of smoke.

When an area has been shot, the Hydrocrane removes the mats and sets them aside. The all-hydraulic crane is then fitted with a ⅜-yd. clamshell bucket. Equipped with the clam the Hydrocane lifts out the broken rock, either placing it on a Chevrolet dump or piling it for future use, as was done here.

This sequence was repeated until all the rock was removed. Finally, the Hydrocrane packed the blasting

• Below: Hydraulic pressure enables clamshell jaws to grasp large pieces of rock when cleaning out excavation. Right: The head man, U. O. MacDonald, takes over the controls for a few minutes to help dislodge a stubborn piece of rock.

• Top and left: Waiting for afternoon job to open up, Bucyrus-Erie H-3 Hydrohoe helps take blasted rock out of swimming pool excavation.

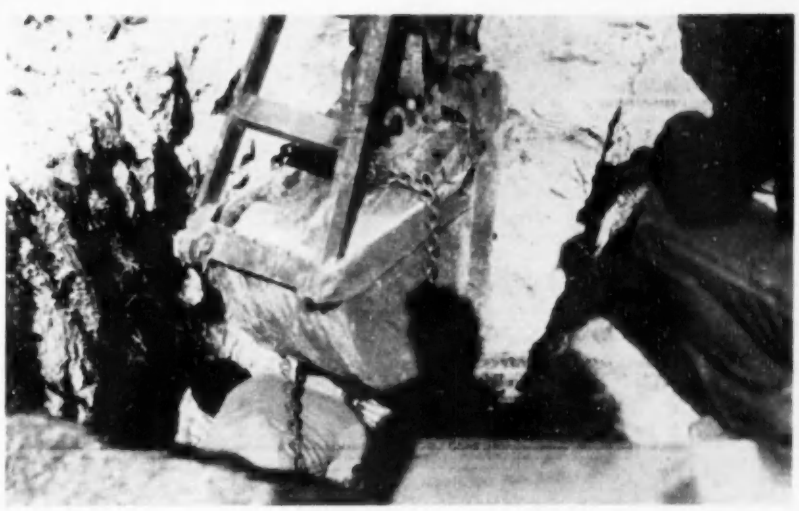
mats back onto the flatbed. The H-3 operator then racked-up the bucket on the back of his rig, retracted the outriggers and drove away after the platform truck to the next job.

The Hydrocrane is typical of MacDonald's equipment in that it reflects the mobility consciousness of the organization. Although there are only 11 full-time employees in the firm, the company owns 11 trucks, enough "to go around." Somedays, MacDonald says, they are all on the road.

Everything On Rubber

In addition to the Hydrocrane and the platform truck, there are two rear-dump trucks for haulage. Four of the compressors are truck-mounted. Two pick-ups and the firm's new Bucyrus-Erie H-3 Hydrohoe round out the rolling stock. All trucks are Chevrolets except the GMC flatbed. When idle, a rare circumstance, they are housed in the shop which is next to MacDonald's parking-lot office.

Owning a large number of trucks helps MacDonald. It allows him to



• Top: On a water tie-in, the Hydrohoe cranes an Ingersoll-Rand pipe threading machine from Town of Braintree truck and lowers it into hole as shown at right.

handle widely separated jobs—the mat truck and Hydrocrane were taking off for Fall River, 45 miles away, right after they were through with the swimming pool job. The trucks allow MacDonald to keep his labor force small and efficient. On short notice, he can move his men and equipment to almost any site in New England.

Helping muck out rock at the swimming pool site was MacDonald's Bucyrus-Erie H-3 Hydrohoe. In practice, the hoe is seldom put to work on rock but it happened that the machine was was waiting for go-ahead on another job. This was a fairly new machine which he bought last summer. His plans were to buy the conventional Hydrocrane with crane boom and clamshell to help out on excavation. When MacDonald visited the manufacturer's plant in South Milwaukee, Wis., he was impressed with the new hoe front end. He ordered one. In fact, he asked that the machine be equipped with hoe for the trip home. He thought the weight would give better balance to the rig for the 1200-mile journey, as he was going to handle his own delivery. At the same time, he ordered the crane boom front-end to be shipped by rail. The front end equipment on the machine is convertible from crane to hoe and vice versa in a few hours' time.

He arrived home in good time with the Hydrohoe and parked the machine in his yard, awaiting delivery of the crane boom. Over the week-end, a town official spotted it and asked if it was for hire. For the next three weeks, the machine worked 12 hours a day at a variety of assignments. It dug trench for the water, sewer, and highway departments of the Town of Braintree.

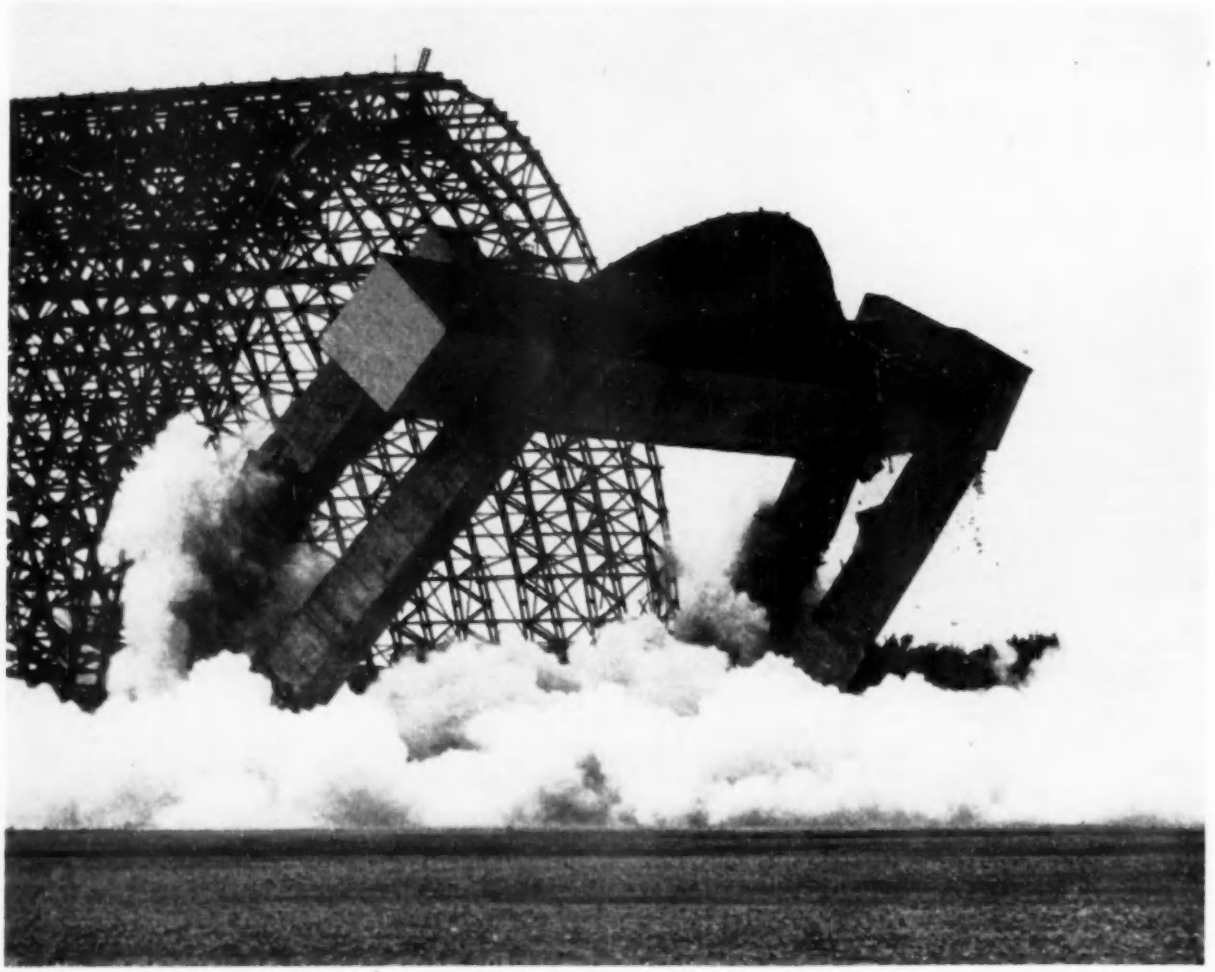
Five months later, the crane boom still rested in the yard, brand new with shipping tags still on it. The Hydrohoe has never been idle, although MacDonald has managed to stabilize its work day to a standard eight hours. The present two H-3's which MacDonald owns replace two H-2 Hydrocranes which marked his entry into the excavation field. He bought the first one in 1947.

Digs Water Tie-Ins

In the afternoon when the pool job was completed, the Hydrohoe went to the aid of the Braintree water department. It excavated several ditches for new house tap-ins. In between these it acted as a crane, helping handle the installation of a big valve. With a chain attached to its bucket,

• Above left: Hydrohoe arrives at scene of tap-in excavation with boom and bucket stowed forward in traveling position. Above right: Operator swings boom around and begins trench.

• One end of the lighter-than-air hangar at South Weymouth comes down with a MacDonald blast.



• As ditch approached roadway, Hydrohoe was moved to position parallel with traffic. Thus excavation could continue without blocking cars using street.

the Hydrohoe lifted an Ingersoll-Rand tapping machine off a truck and lowered it with nerveless precision to the pipe end in the excavation.

In doing the house tie-in excavations, the Hydrohoe completed about half the length of ditch with the truck hood sticking out half-way across the road. Then the operator re-spotted the truck crane so that its length hugged the curb. In this way, the machine completed the tie-in without completely blocking traffic at any time.

Although smaller jobs put quite a piece of change in the company till, MacDonald's organization handles the big ones with equal aplomb. The largest single job he has undertaken was part of the relocation of the highway at Union Village Dam in Vermont. Here his crews drilled and blasted out 135,000 yards of the seamy, bastard rock which is native to New England.

In 1951, he took down a Navy lighter-than-air hangar at the base in South Weymouth. The cavernous building had to be removed to make way for a runway extension in converting the field to jet use. The structure was 1090 feet long, 220 feet wide, and 180 feet high. It was faced at both ends with huge portals of reinforced concrete and stone. MacDonald mounted his air drills on the trucks, put 350 holes into the base at the south end of the hangar. These he filled with 500 pounds of dynamite. It was detonated and one end of the hangar fell forward in a neat pile of rubble. The procedure was repeated at the north end. Debris was taken away and the center structure demolished by a wrecking contractor.

Near his office is a large modern Chevrolet garage and sales room. This area was formerly occupied by a large rock hill. MacDonald took it down piece by piece. He used 20,000 pounds of dynamite before he had the 17,500 yards of rock removed. He exploded as much as 600 pounds of dynamite at a time but never disturbed one of the surrounding buildings. It is smack in the heart of a typical downtown section, too. MacDonald likes to recall that no driver ever ran into the hill but as soon as it was down someone smashed into the light pole which had stood in front of it for many years.

From Rock to Quicksand

Recently, MacDonald took over a sizeable excavation-only contract. He put in a stretch of sewer through quicksand for the city of New Bedford. Sheeting had to be set in place as soon as the Hydrohoe bucket was pulled. MacDonald thinks the narrow bucket helped out because it reduced the amount of material that had to be taken out to put down the trench. Thus the sheeting could be placed faster. About 20,000 yards of material were excavated before the job was finished.

We could pile up a lot of wordage recording the interesting jobs met and conquered by the MacDonald team. Making a specialty of precision blasting makes for unusual yarns. And the way MacDonald moves around we might be a long time bringing our story up to date. We can hear the phone ringing now.

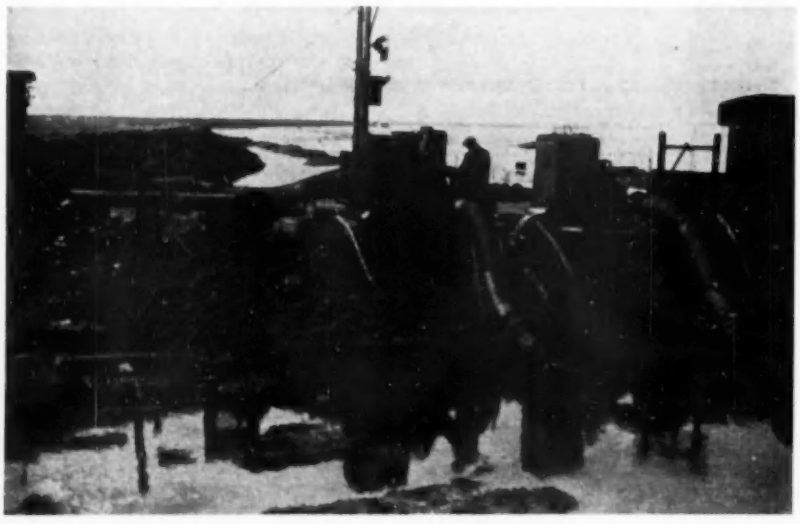
• A Chevrolet dump serves as platform for drillers with an Ingersoll-Rand J-50 pneumatic hammer as they sink blast holes in the hangar pillars.

Construction Machines Battle England's Flood

by Edmund Updale

In February, British contractors quickly moved in heavy equipment when sea and wind launched biggest blow in 600 years. Here's how they went to work.

• Smashed concrete steps and walks of promenade deck and demolished metal buildings line shore at Mablethorpe. In distance, rigs drive pile to thwart tidal wave. *Grimsby Evening Telegraph Photo.*



• Above: On Foulness Island, a tractor dozes material back into breached sea wall. Below: Another Foulness island scene shows two 2000-gpm pumps taking out water so there will be more working area.

THE solemn voice of Winston Churchill was telling Britain's House of Commons that 128 men, women, and children had been lost in the nation's worst shipping disaster since the Titanic struck an iceberg—the loss of the motor vessel Princess Victoria, 2,694 tons, off the coast of Northern Ireland. He paused to accept a messenger's note which he read with sadness.

The note passed along in a crowded House of Commons in February gave the latest available figure of dead, in a disaster caused by the most merciless seas to batter the island for more than 600 years.

Only a few hours after the Princess Victoria went down tens of thousands of people were homeless. Hundreds were feared dead. In the final count the fears were borne out: 307 lives lost. That was along England's east coast, excluding the Princess Victoria.

The screaming gale, which flogged the North Sea to undreamed-of fury that night of the full moon, tore on to the Netherlands. The sea claimed back one-sixth of the country's 13,000 square miles. It took a death toll in Holland which the latest count placed at 1,487. It is believed that many bodies washed out to sea.

Work Ahead

While two nations mourned, there was work to be done. That work *was* done.

So great was the flooding that widespread sluicing and pumping were

necessary before even the lightest equipment could be safely mounted in the neighborhood of the coast defenses. All three armed services—and many United States servicemen—helped in the work of bringing up the pumps and lines from every available source.

While a crew of 25,000 men carried on with hand labor, the level of the floodwaters began to fall as the pumps, of all makes, went into action. Divers were able to go down to clear clogged storm sewers. Aerial photographs began to show land as well as water, and sites could be selected for the positioning of the first tools—dozers and scrapers—to follow up the pumping teams.

Mablethorpe, on the torn coast of Lincolnshire is an example of what is happening in one typically hard-hit resort. Wimpey is on the job. They are among the biggest civil engineering contractors in the British Commonwealth. Fighting with their backs to the sea, the Wimpey men were confronted with mud up to 12 feet deep. On the night of the disaster raging seas tore round behind the sea wall and gouged deep channels, 100-ft. wide, through sand dunes. Sixty-foot mounds were broken up and swirled into the town.

The first move was to rush hundreds of tons of piling equipment and piles to the sea front, to seal the gaps. Three top men were taken off important contracts to get things moving. The piling began to arrive—in vast quantities, as it was arriving all the way down the coast under the impetus of other companies doing similar work.

Within a few days 1,200 tons of plant and material had been bought up by Wimpeys. Mobile offices, and mobile canteens for the employees, were rushed up. The Ministry of Food waived rationing controls so that food would be available without delay.

Big Tide Due

Tons of smashed concrete stairway and promenade were cleared away by Ruston-Bucyrus machines, and more RB's from the Wimpey fleet began to drive in the Larsen No. 2 and Appleby-Frodingham piling. It was a race against time, for another huge tide had to be faced within a few days by the hastily-repaired sea-wall.

When the men were not working—which in some cases was for only six hours out of twenty-four—they slept in a holiday camp perched on the windswept cliffs. Bedding was sent up from London, and the Wimpey force, drawn from Manchester, Nottingham, Birmingham, and other contracts, were made as comfortable as possible.

The dozer and scraper teams went to work, as soon as it was possible to get at any high standing ground and rob it to fill the breaches to a safe height. International and Caterpillar crawlers found thousands of tons of material and got it through to the sea wall. They tore into the remains of big dunes, leaving only flat tops at a safe height above sea level.

Ruston-Bucyrus machines, crane-rigged swung the piling into position and drove it home with BSP pilehammers. Spencer-Hopwood boilers supplied steam to the hammers. CPT compressors and rock drills did valuable work.

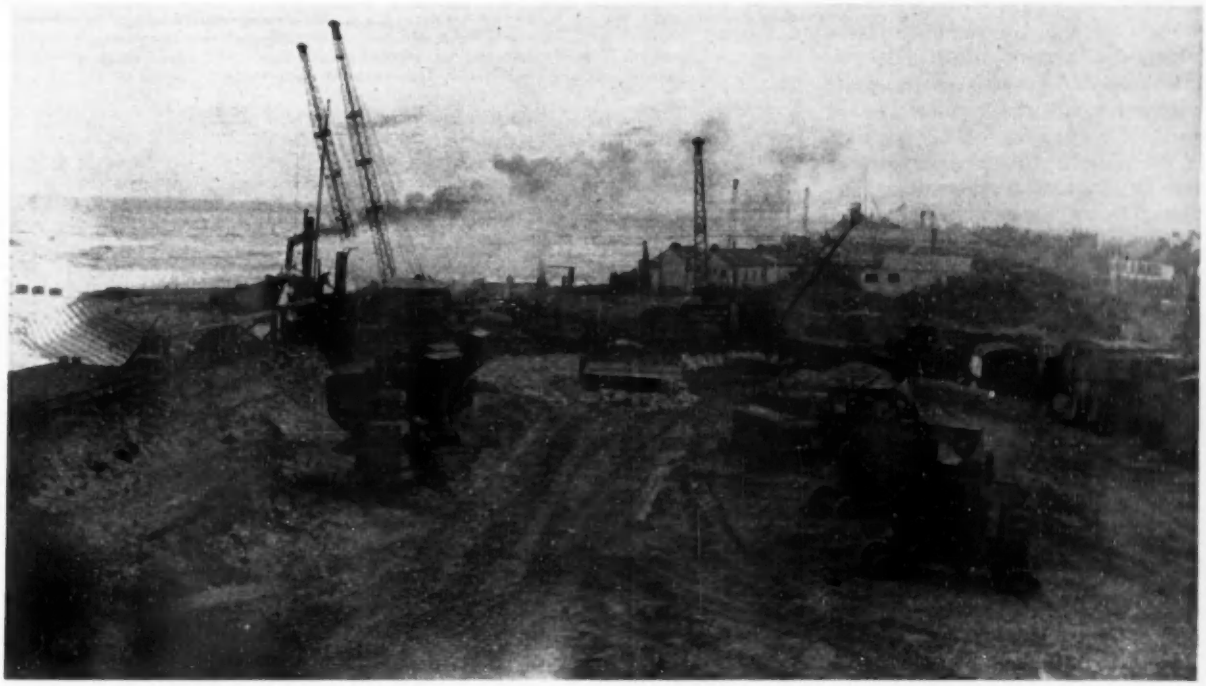
The firm's central plant depot was sending more equipment along all the time.

Transportation of this equipment was in itself equal to a major contract—and remember, this effort was being duplicated a hundred times along England's east coast.

Servicing of the Wimpey job was the task of Andy Mitchell. All he got was a cat-nap now and then. Alf Fletcher had the task of finding the men to do the work, and he found them.

Rebuilding the wall went so well that the river board authorities begged the company to undertake further rush repairs in another vulnerable area. The request was met. Less than twenty-four hours after it had been made

• Mixers, compressors, Caterpillar and International crawlers, and Ruston-Bucyrus cranes belonging to Wimpey, large English contractor, crowd shoreline at the Lincolnshire village of Mablethorpe. Cranes are driving piles which will protect village from tidal wave which soon followed storm. *Grimsby Evening Telegraph Photo.*



• Muir-Hill reversible-seat dumpers carry muck excavated by dragline to Foulness Island sea wall.

• Above: Six Ruston-Bucyrus cranes back up remaining Mablethorpe promenade with interlocking sheet piling. *Grimsby Evening Telegraph Photo.*

another eight Ruston-Bucyrus excavators were on the way from distant jobs.

Six more International tractors arrived for dozing and scraping. Four more BSP piling hammers, Spencer-Hopwood boilers, three CPT compressors, five concrete mixers, extra bedding, camp gear—all arrived with the precision of a military operation.

The next big tide was only a few days away—the tide that would test England's patched-up coast.

Twelve-by-twelve timbers were brought up and hurled into position. Soon there were 15 Ruston-Bucyrus excavators and cranes at work on this one tiny sector of the whole disaster zone.

There were twelve Internationals and Cats now, six compressors, forty tons of heavy timbers, nearly 300 tons of piling, seven sets of piling gear and a mass of small plant—and still it came. Two Michigan cranes were added to the pool.

Four 2KW Listers, three 1KW Atlas Diesels, generated day and night. Piles were being pitched at the rate of more than 100 a long-shift.

Then the weather, which had been bitter, became even more surly. For two and a half days no piles could be driven, and the major gales ruled out a great amount of heavy work.

But somehow work did go on, with the draglines and the tractor boys filling as fast as the 90 mph gusts permitted. In less than a week an estimated 75,000 yards of filling was slugged into Mablethorpe's breaches. Work went on at full speed with the deadline for another exceptionally high tide now only two days away. As Andy Mitchell told *Excavating Engineer:* "It's a real Wimpey do."

When the great tide did come, it was even higher than anticipated. Hardly a drop of the North Sea got through—everyone had reckoned on giving an extra bit of height, and all was well.

It would be impossible to deal in this short space with all the efforts made by engineers to meet the emergency. A few examples speak for all, whose names alone would outrun the columns available for this report.

Sir David Maxwell Fyfe, the Home Secretary, who is in charge of the overall planning of repair work right down the coastline, disclosed in a report that the sea had punched 1,200 breaches in the sea walls. They have all been sealed against renewed spring tides.

Scores of towns, hundreds of ham-

• At Sandilands, on the Lincolnshire coast, an Aveling-Barford 4½-yd. Diesel dump takes on load of concrete which will stabilize new sea wall. Rex mixers supply concrete while Bucyrus-Erie dozer on International crawler keeps work site in shape. Contractor Lehane, Mackenzie and Shand, Ltd., owns the equipment.

● Right: A Royal Navy diver reports after trying to free an emergency flood tunnel portal in the main street of Harwich. *London Daily Mirror Photo.*

lets, were flooded. The dead have been removed—17 Americans perished—and homes have been re-opened.

Coryton, opposite tragic Canvey Island, where 58 people were drowned or died from exposure, was cleaned up by John Laing's company. Throughout the first day following the breakthrough by the sea, labor and materials were gathered for an all-out effort to stay the tides expected later. Lighters and tugs stood by, to help.

Four thousand men worked on first-aid sandbagging in sub-zero temperatures, and breaches were sealed one by one until all dykes had been strengthened. A hundred men at Laing's plant and transport depot repeated the Wimpey moves.

The Yard Helps

Scotland Yard, London's police headquarters, planned speedy road routes for the transport of emergency equipment, and 70 pieces of Laing's heavy equipment, including 24 trucks, International and Caterpillar tractors, several big excavators, row boats, and mobile offices were soon on the way.

So the story of striving and success goes on. At Foulness Island 1,400 troops and many civilians went over the flood to seal the breaches. Here again, it was some time before a foothold could be found for equipment, but the diggers and dozers were ready to move in at an instant's notice, when the opportunity came.

Colonel Fison, of the Royal Engineers in the Shoeburyness zone, which contains Foulness, was seldom out of uniform and waders for a week. Fison told *Excavating Engineer* the story heard so often—"the men worked wonders." And he apologized for "an apparent lack of equipment in use," explaining that it just could not all be provided with work-space, owing to the appalling state of the coast.

Big gangs were keeping the repaired breaches firm and high by hand, and it had been possible to deploy some diggers to speed this very hard work against the tide. A Ruston-Bucyrus 19B dragline perched on the seawall quickly filled in several serious gaps, while an Allis-Chalmers HD-14 dozed up the landward side of part of the sea-wall. Other draglines, Ransomes and NCK among them, filled trim little reversible-steering Muir-Hill dumpers which kept dozers supplied with muck to ram home.

Pumps were in action, and it was mighty satisfying to the men when the tips of grass began to appear as the water was drawn off and sent seaward along the island's creeks. But a few million gallons of water remained to be cleared when this problem site was visited.

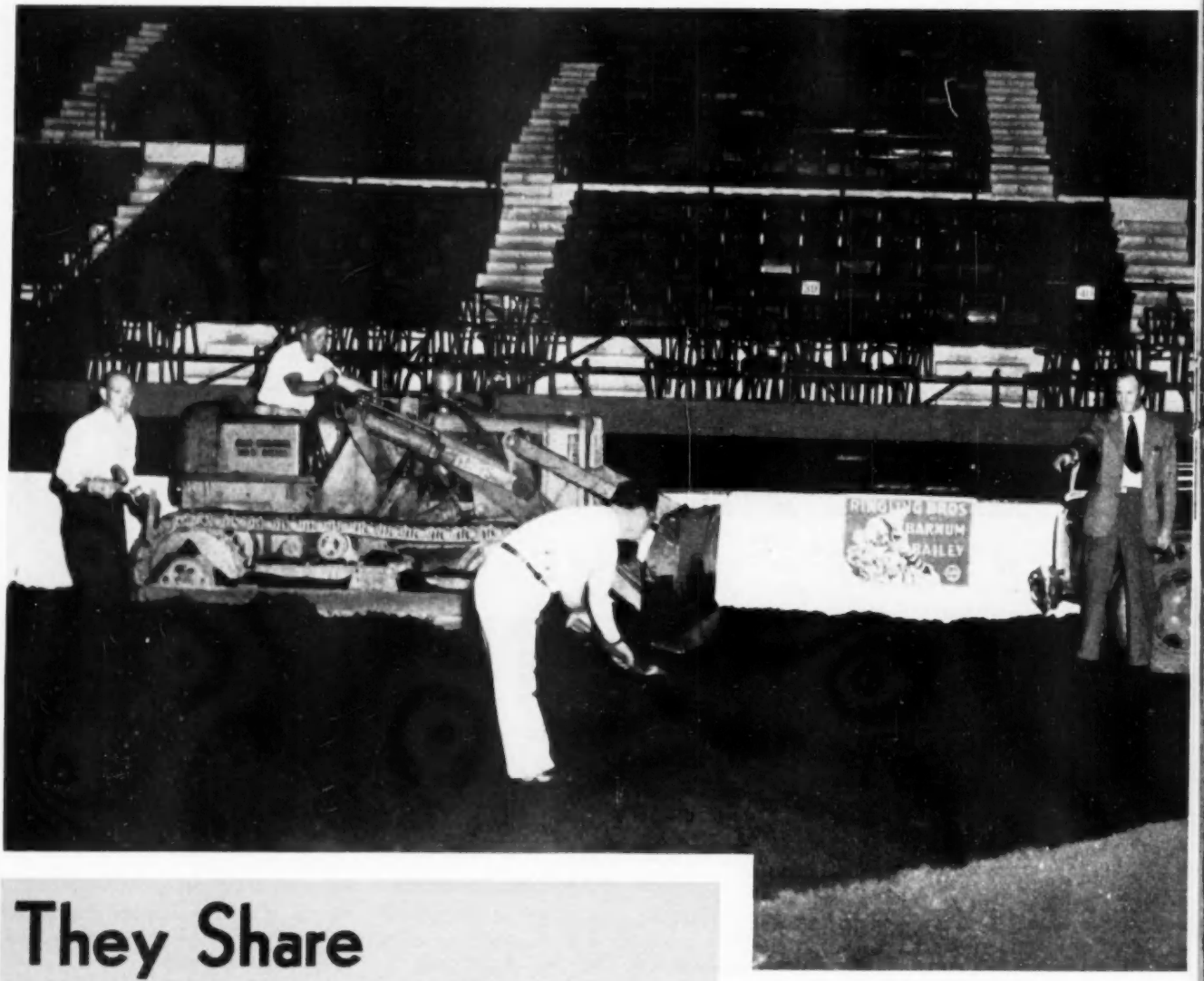
The merit of getting a local man's opinion on a job was borne out here. Two civilians who had for years been employed on general tidying-up of the sea walls were able to tell, almost by the tip of a fence in forty acres of flood, where the road lay, where this or that pot-hole was.

With the aid of men like these the roads, mostly four feet under water, in some cases ten feet under, were soon staked out, and truck drivers got through on high-built Matadors with vital equipment for the front.

Later, when the flood level had in many places been reduced to one or two feet, the front could be reached by normal trucks taking wide detours. All of the Shoeburyness plant in the works depot was flooded, and as in many other parts of east England, there is a mountain of stripping and rebuilding work to be done.

As the position improves with the summer ahead, heavier equipment will be brought in all along the jagged line.

The great battle goes on, long after it has ceased to be news to the man in the street. Sympathy goes out to the bereaved. Praise belongs to those who did their best in the hour of disaster.



They Share in Boston's Progress

J. Sullivan Sons periodically spreads indoor dirt blanket for Boston Garden audiences. It's only natural that Bostonians should look upon this contractor's work. They've been doing it for 65 years.

• Preceding Boston appearance of circus, J. Sullivan Sons spreads 7-in. layer of loam over Garden floor. Ford truck hauled material in and Allis-Chalmers HD-5 crawler with Tracto-Shovel dozer blade levels it.

ONE of the more unusual excavating and grading contracts in existence is that between the Boston Garden and J. Sullivan Sons, Cambridge, Mass. Four or five times each year, the contractor prepares the big arena for shows which require a dirt floor. The rodeo, Barnum & Bailey circus, and horse shows are examples of productions needing the special base.

The problem is to spread a perfectly level 7-in. layer of ground over the terrazzo Garden floor. The main ingredient is 600 yards of dirt. Sullivan borrows it from his Cambridge stockpile which is a mixture of loam and calcium chloride. The latter draws moisture from the air and keeps the dirt fresh. A ¾-yd. Bucyrus-Erie shovel loads trucks which haul the dirt into the Garden.

Speed Counts

Two bulldozers and a 25-man crew handle the extremely-fine grading of the dirt floor. When the show is over, a Hough and two other high lifts load out the loam which is returned to stockpile. Because the arena may not be tied up by these preparations, speed is a must. The Sullivan firm completes the leveling in four hours, cleans up in much less time.

There is something perfectly natural about seeing Sullivan's rigs in Boston Garden or anyplace else in the heart of the big city. They have been busy there, bringing the progress which starts with excavation, for 65 years.

One week last fall, J. Sullivan Sons' tractors, trucks, and excavators were pushing, hauling, and digging dirt on a number of worthwhile projects in

January, 1891

This may certify that the bearer, Jeremiah Sullivan, of Cambridge, Mass., has been the Contractor and Grader of a heavy piece of excavation and grading of which I was the Engineer in charge, and that he took the job on his own responsibility, and that he prosecuted the work and completed the same in a pleasant, thorough and workmanlike manner. The job required the excavation and hauling and grading of twenty-eight thousand, six hundred and eighty three [28,683] cubic yards of earthworks over twenty [20] acres of Athletic Field, which was carefully finished for seeding, and the whole job was done and completed in a brief period of sixty days.

Mr. Sullivan has tools and appliances, and is well equipped to undertake and do large jobs of excavation and grading, and my acquaintance with him has been as with a sober, industrious and well-meaning man, who has shown his ability to handle earthworks economically and expeditiously, and I take pleasure in recommending him to any one having such work to do or to be done.

Very respectfully,

John C. Wait,

Engineering Dept. of Harvard University

the Bean City environs. It was a typical week for the fast-moving contractor.

High up on Parker Hill—where there is a picture postcard view of the metropolis—they were taking out 25,000 yards for an addition to the New England Baptist hospital. Two Bucyrus-Erie excavators, both under Caterpillar Diesel power, were making the big cut. One was a 1½-yd. 38-B shovel and the other a ¾-yd. 22-B dragshovel. Dirt was trucked across the street and became fill for increased building area on the downslope of the hill. An Allis-Chalmers HD-7 tractor used a Gar Wood blade to grade the fill.

A new Enterprise Store was going up in Roxbury and one of the Sullivan ¾-yd. shovels was there to move 3000 yards of dirt away to make room for the basement. The GMC Diesel powered excavator was loading to Ford,

● Above: Jeremiah Sullivan received this letter in recognition of some of his earliest work. Below: A GMC Diesel-powered Bucyrus-Erie 22-B clears out site for new store in Roxbury. Mack truck carries dirt and debris away.

Mack, and Sterling trucks . . . For Northeastern University in downtown Boston, the Sullivan machines were moving 35,000 yards of dirt before the construction of a new physical education center could begin. A ¾-yd. drag-shovel was on the job here . . . A new nurses' home would rise at Massachusetts General Hospital where a Sullivan crew was digging a 5000-yd. excavation. . . .

. . . The start of a new building at Wellesley College was being heralded by a 15 to 20,000-yd. excavation under contract to Sullivan . . . A Sullivan-dug 10,000-yd. excavation at Woburn was preceding the construction of plant additions for Borden Ice Cream . . . In South Boston, they have the excavating, grading, and backfilling contract for a meat packing plant. Boston's provisional plants have lately been ordered to re-locate outside of the downtown area.

● Above: A 1½-yd. Bucyrus-Erie 38-B shovel belonging to the Sullivan pool of equipment takes dirt out of a 25,000-yd. cut. Excavation starts addition for New England Baptist hospital. Below: They run the firm: Left, Joseph L. Sullivan, and right, General Superintendent James P. Moroney.

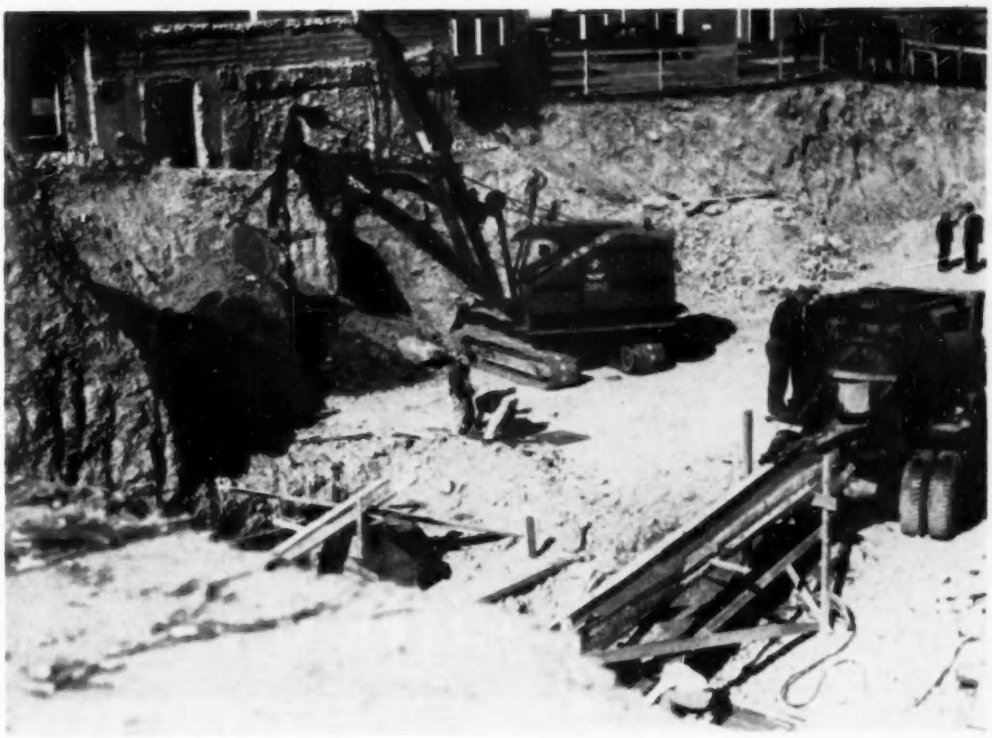
Early Recognition

The week's work outlined above is typical of most weeks which have passed since Jeremiah Sullivan started his business. Compile a list of any 10 Boston sights and you'll probably find that the Sullivans had a hand in nine of them. They've helped build Watertown Arsenal, Massachusetts Institute of Technology, Cadillac building, Police Headquarters, North Station, Boston Garden, First National Stores warehouse, Gallups Island immigration station, New England Mutual building, biggest building excavation ever made in Boston, Boston University, Logan airport, Children's Hospital, and Harvard University, to name only a handful of landmarks. It was in 1891, when Jeremiah Sullivan finished grading Soldiers Field for Harvard that he received the interesting letter of recommendation which is reprinted here.

Today the firm is a partnership between one of Jeremiah's 14 children, and Katherine D. Sullivan, widow of Joe's brother, Daniel. The day-to-day business of excavating, however, is in the capable hands of Joe and James P. Moroney, engineer and general superintendent since 1924.

Joe is an enthusiastic, friendly man whose appearance and outlook deny his 50 plus years. On those rare occasions when you find him indoors, you'll see him in the company offices at 25 Willard Street, Cambridge, at the exact spot where Jeremiah started out 65 years ago. Office manager for the firm is Josephine McDonald, daughter of one of Jeremiah's first employees. Her knowledge of the earth-moving business certainly entitles her to prominent mention in the organization.

Joseph, Jr., one of Joe's five children and only boy in the family, is currently serving with the Army Engineers in Korea where he is a sergeant in the transportation division. Before that he was enrolled at Boston University and his spare time was spent on J. Sullivan Sons jobs, preparing to carry on the family tradition of building a better Boston.



• High on Parker Hill, the diamond-shaped "S" identifies the Sullivan excavator working on Baptist Hospital addition. The machine is a ¾-yd. Bucyrus-Erie 22-B.

• Here is a 1929-era shot of Sullivan equipment on the way to a job. Truck is a Mack; shovel, a Bucyrus-Erie; trailer, a Rogers.

• An HD-7 Allis-Chalmers tractor with Gar Wood blade levels spoil taken from the Baptist Hospital excavation. Most of Boston may be seen from this hill.

Southern Superintendent Says

"We load quicker, haul faster and Move More Dirt!"

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS

Atlanta airport expansion job is scene of new triumph for International power

When C. A. A. district headquarters decided to move to Atlanta, Georgia, the east-west runway at nearby Fulton County Airport had to be extended to 5,000-foot length.

One contractor, C. L. Rhodes of Decatur, Georgia, is doing the entire job, including cutting through a 39-foot hill and moving 350,000 cubic yards of sandy clay.

Rhodes' General Superintendent, R. N. Smith, tells how the work is going:

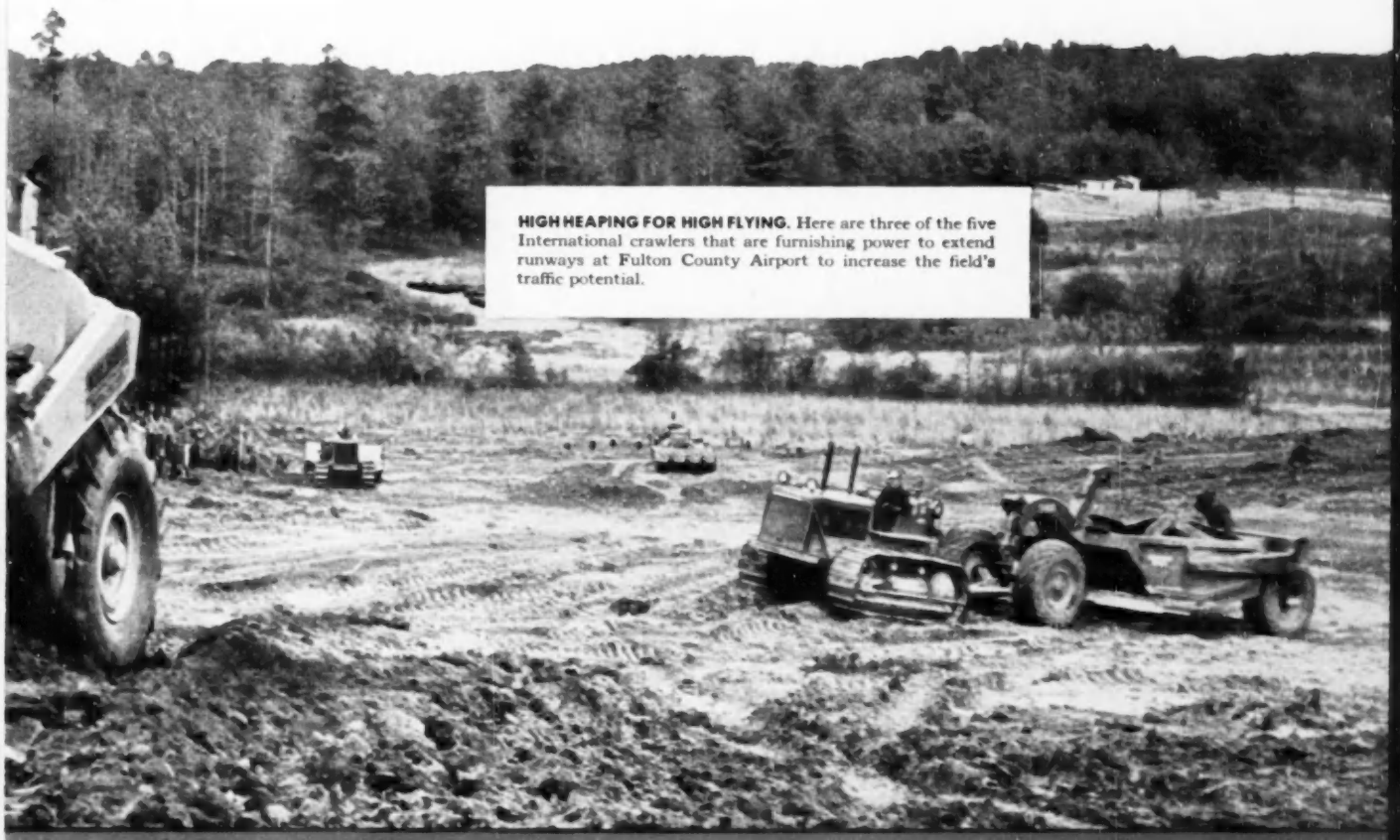
"We load quicker, haul faster and move more dirt with our Internationals than with any other crawlers.

"Our operators push 'em to the limit all day long to get the job done ahead of schedule. The tractors get clean filters, fuel and grease, and hard work—more hard work than is reasonable—and they take it month after month without a let down!"

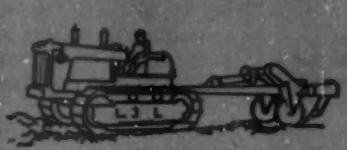
That's what International owners everywhere are finding out. Find out for yourself. Ask your International Industrial Distributor for details.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

JOHNNY-ON-THE-SPOT SERVICE. A fast field service team from International's Atlanta distributor rolls up to the job site. Service like this from *your* International distributor is as near as your nearest telephone, to cut down downtime and keep your equipment rolling!

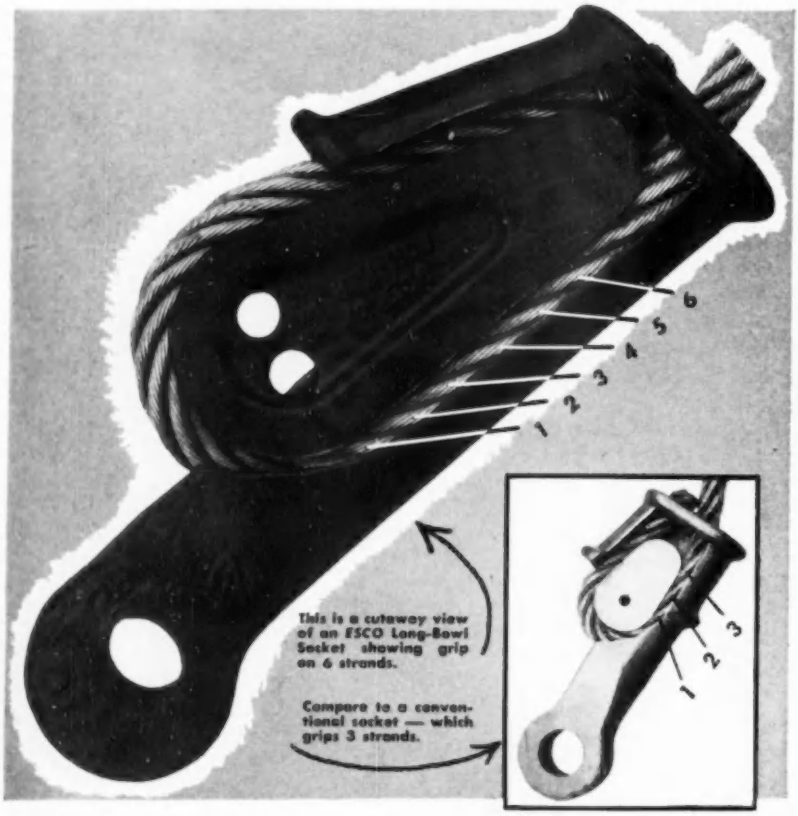


HIGH HEAPING FOR HIGH FLYING. Here are three of the five International crawlers that are furnishing power to extend runways at Fulton County Airport to increase the field's traffic potential.



GRIPS ALL 6 STRANDS

to make wire rope last longer!



ESCO LONG-BOWL® SOCKETS IMPROVE DRAG ROPE LIFE

ESCO LONG-BOWL SOCKETS take wire rope sizes ½" to 2⅛", develop more than 90% of rope strength. Extra-strong, yet easy to take apart and assemble. No kinking!

When Breaks Occur Due to Uneven Strand Loading

Extensive *ESCO* field and laboratory tests have demonstrated that a major cause of drag line breakage is uneven loading of the rope strands. And the cause of this faulty loading generally lies in a conventional rope socket which barely grips *three* of the six strands! In resocketing this type of break, as much as four feet of *good* rope must be discarded. As a rule, a few breaks make your remaining rope too short for use, and it, too, must be discarded!

With ESCO Long-Bowl Sockets, your drag line gets a chance to wear out — instead of shortening itself into discard! Write today for full details. Ask for Catalog 192.

ESCO

Offices and Warehouses: Honlulu, T. H., Houston, Texas, New York, N. Y., Los Angeles, San Francisco, California; Seattle, Spokane, Washington, Centralia, Pennsylvania, Eugene, Oregon, Salt Lake City, Utah. In Canada: Vancouver, B. C., and Toronto, Ontario.

Representatives in all Major Cities

ELECTRIC STEEL FOUNDRY CO.

2141 N. W. 25TH AVE., PORTLAND 10, ORE. 712 PORTER ST., DANVILLE, ILL.

News from the Field

Truck Output High

Despite the lost production of 107,000 trucks during the third quarter of 1952 as a direct result of the long steel strike, truck manufacturers were able to produce 1,015,649 units during the year. This was 45,000 less than the total authorized production schedule for 1952, according to a recent announcement by the National Production Authority, Department of Commerce.

R. H. Fussell, chief of the Truck and Trailer Branch in the Motor Vehicle Division, reported that the truck market during the past year was a healthy one and shows signs that this condition will prevail in 1953.

Name Chairman

R. T. Amis, Jr., well known contractor and partner in the Amis Construction Co., was honored recently when he was elected 1953 chairman of the Utility Airplane Council of the Aircraft Industries Association. He was also elected to the board of governors of the Aircraft Industry Association.

Amis, who is also president of the Aero Design and Engineering Co. of Oklahoma City, succeeds C. F. B. Roth, president of Air Cooled Motors, Inc., Syracuse, N. Y., in both positions.

Amis and his brother, W. D. Amis, are co-owners of the Amis Construction Co., one of the largest construction concerns in the middlewest. The firm conducts scattered heavy construction projects on roads, dams, and bridges throughout this country and Mexico.

Name Reindollar Head of American Road Builders

Robert M. Reindollar, consulting engineer of Baltimore, Md., was elected president of the American Road Builders' Association at its convention held in Boston, Mass., February 9-11.

The new head of America's oldest good roads organization has been connected with the State Roads Commission of Maryland for 40 years, joining in 1910 as a rodman with a surveying party. He worked his way upward until he was appointed chairman of the commission in 1945, a

Continued on page 48

GM DIESEL
CASE HISTORY No. 528-2

USER: Ritchie Brothers Construction Co., Wichita, Kansas, paving contractor.

INSTALLATION: GM 3-71 Diesel, replacing an 8 cylinder gasoline engine in a 3/4 yard dragline equipped with 46 foot boom.

PERFORMANCE: Plant Superintendent H. G. Hoffman reports the power and quick pickup of the GM Diesel engine permit this dragline to do 25% more work. Fuel and maintenance costs are both reduced.

PRODUCTION WENT UP 25%

when GM Diesel went in

"General Motors Diesel power made a real shovel out of this unit," says Mr. Hoffman. "We also use a 6-71 to power an asphalt plant, and recently, when we bought a new shovel, we ordered it equipped with GM Diesel power."

In new equipment or old, a 2-cycle GM Diesel gets more work done at lower cost. It produces power at every piston downstroke to give equipment maximum torque the *instant* a load hits—*before* engine r.p.m. falls off. A GM Diesel starts at the push of a button, burns few gallons of low-cost fuel, and delivers years of dependable service. Parts cost less and are readily available. Talk with other GM Diesel owners. Then see your GM Diesel distributor for economical horsepower—for any job.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS · DETROIT 28, MICHIGAN
SINGLE ENGINES...to 275 H.P. MULTIPLE UNITS...Up to 840 H.P.

It pays to Standardize on

GM
GENERAL MOTORS
DIESEL
POWER

Write for booklet, "A 50,000,000 Horsepower Insurance Policy" that tells you why.

Advertisement

LeTourneau pictures of the month . . .

BAGDAD HAULER — This 40-ton Tournarocker is one of Bagdad Copper Corp's haul units. The company, which mines copper at Bagdad, Ariz, also owns a 50-ton Tournarocker. Cycle of 4500 ft takes the 40-ton 'Rockers 11.2 min, despite 650 ft of 10% adverse grade and narrow haul roads. Cycle time includes 2 min to load from a 4-yd shovel, and ½ min to spot and dump. Disc-type 4-wheel air brakes let operator haul in 3rd gear along the narrow benches with complete confidence and safety

SCRAPER BECOMES DOZER — Down in sports-loving Uruguay, this D Tournapull self-loaded 52,300 yds of clay to level a site for a new stadium. Hourly output averaged 100 yds. With its dozer blade, the "D" also dozed fill and broke up the surface of a highway which crossed the stadium area.

22% MORE COAL — Stockpiling coal for a power station in Rhode Island, Tournatractor dozed 16,850 cu ft (420 tons) of coal in 2 hrs . . . outproduced a crawler-tractor working under identical conditions by 77 tons (or 22%). Coal was moved 190 ft down a gradual slope, then over a steep 25-ft bank.

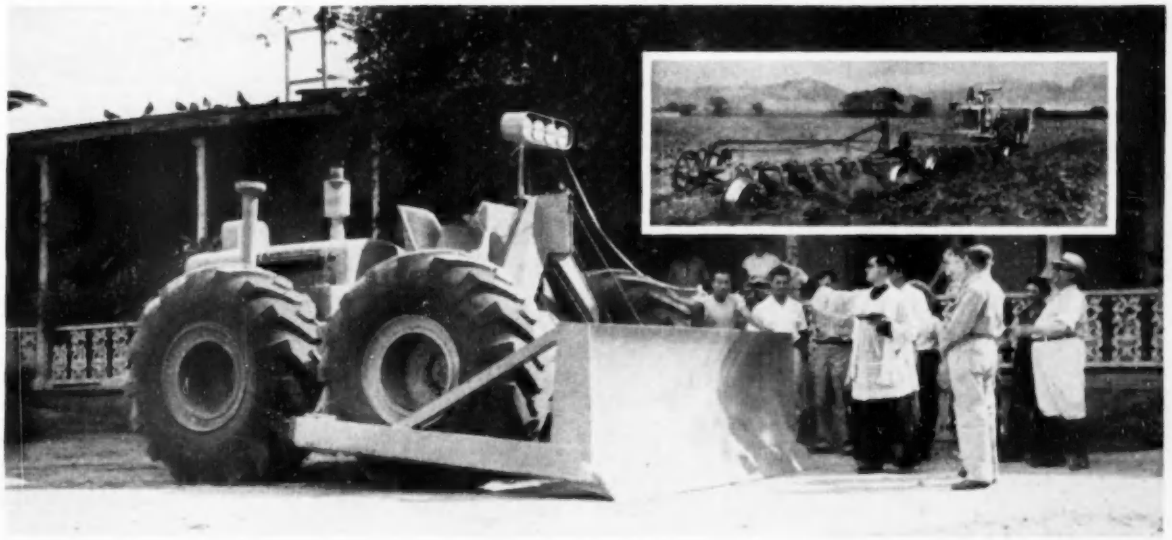
Advertisement

Performance reports on LeTourneau equipment

DIAMOND MINER — Near Kasai, Belgian Congo, 9 C Tournapulls and 5 Tournatractors are stripping 7,850,000 cu yds of overburden to uncover industrial diamond deposits. Push-loaded by a 186 hp Tournatractor, each Tournapull removes 6 to 7½ loads (59 to 73 pay yds) of clayey sand hourly on a 1-mile cycle.

LOVELY VIEW — New 16-yd scraper for C Tournapull mounts control motors on bracket above yoke. Says Bob King, operator for Kiker & Yount of Reidsville, N C, "This new Carryall has everything beat. With the motors up out of the way, I can watch the pusher better. This Carryall spreads better, too. Dirt really rolls out."

40% LOWER COSTS — No, these rocks weren't "frozen" into the Tournarocker. High-speed photography makes them look like it, but actually dump took only 5 to 10 seconds on this W. Va. road job. Contractor C. E. Wetherall also reports his Tournarockers give 40% lower hauling costs than trucks. Output for his two 9-ton Tournarockers on typical 1400-ft cycles: 144 pay yds of shovel-loaded rock hourly.

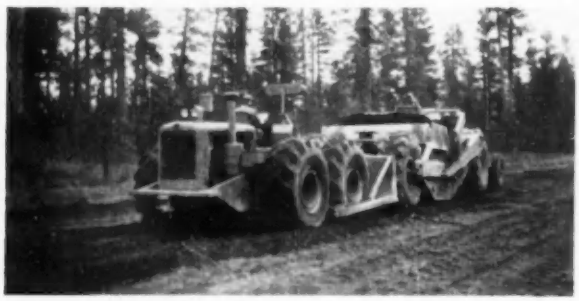


DOUBLE BLESSING — In ceremony, traditional all over South America, padre blesses new Tournatractor. Hacienda Pata-Poo, Peru owner of the unit, has received a blessing, too. Their 19 mph Tournatractor, pulling 2 gang disks, deep-plows 2½ acres hourly — twice crawler output. Tournatractor also pulls 24-in. ripper for sub-soiling. This tool digs 20 in. deep into hard clay, brings up sub-surface water unobtainable with other methods. Explains Plantation Manager de Miguel, "The extra water makes our cane grow healthier, weigh more, and increases sugar content — thus producing more sugar and more profits."

Continued on next page . . .

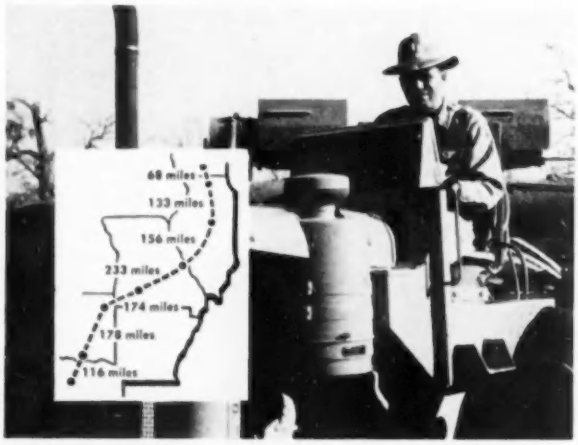
LeTourneau pictures of the month (cont'd) . . .

336 HR JOB IN 12 HRS—When a last-minute telescope breakdown threatened success of the US Navy and National Geographic Society's Solar Eclipse expedition to Khartoum, the Anglo-Egyptian Sudan Government came to the rescue. Its versatile 15-ton Tournacrane carefully hoisted and positioned the delicate 2-ton dish-assembly. The job, which would have taken about 336 man-hrs if done by hand, took only 12 man-hrs with the Tournacrane. Instead of missing the Eclipse they had traveled 7000 miles to see, astronomers not only saw the entire event, but had plenty of time to test and re-adjust settings.



60 LOADS PER HR — At Chemult, Ore, Tournatractor-pusher and 3 self-propelled scrapers account for 60 loads of pumice hourly on 600-ft haul. Load time for over 16 loose yds varies from 25 to 45 seconds. With slower-moving crawler-pusher, output would be about ⅓ less. Contractor: R. A. Heintz Construction Co, Portland, Oregon.

PRECISION SPREADING — Constructing a highway overpass at the intersection of U.S. 16 and State 190 near Powaukee, Wis, C Tournapull spreads load of sandy clay on narrow fill. "Rig is really maneuverable," says Warren Mallo, Job Supt for prime contractors, J. R. Griffith Co, of Racine. "They never have to be backed up to turn around."



1058 MI FOR $60 — Meet the record-holder — Bill Kastner of Madison, Wis! To find warm-weather dirtmoving, Contractor Kastner made the longest solo highway trip of the year with a Tournapull, 1058 miles, Wisconsin-to-Texas. He started the journey at 2 pm Jan 3 at Madison. By 6 pm that day, he had arrived at Rockford, Ill . . . 68 mi in 4 hrs. The second day he ran into a blizzard and made only 133 mi to Bloomington, Ill. His next stop, on Jan 5, was St. Louis, 156 mi further. On Jan 6 he drove 233 mi to Springfield, Mo . . . Jan 7, 174 mi to Pryor, Okla . . . Jan 8, 178 mi to Durant, Okla. At 1:30 pm Jan 9, Kastner arrived in Arlington, Tex. In 6 days, he had driven 1,058 mi (all by daylight) . . . used 180 gals of fuel . . . average, 5.9 mi per gal. Total expenditure for fuel, lodging and food: $59.98. Saving over rail freight: $450.

Advertisement

Performance reports on LeTourneau equipment

8 JOBS FOR JOHNS-MANVILLE — Even though the temperature often reaches 50° below zero, Canadian Johns-Manville works their Tournatractor 24 hrs a day, 6 days a week at their asbestos pit near Matheson, Ontario. One winter month, rig put 535 hrs in on 8 scattered jobs (other hrs went for job-to-job travel, lubrication, etc.). Of total time, unit spent 238 hrs dozing ore to crusher, cleaning around 4 shovels, and maintaining ore stockpile. Another 87 hrs went into tailings-dump maintenance. 62 hrs into waste-dump maintenance. Tournatractor worked 43 hrs towing compressors, wagon-drills, and other mine equipment. For 62 hrs, it plowed snow — in one typical 6¾-hr period, traveling 30 mi and opening 26 mi of road. For 43 hrs, it did such odd jobs as clearing rock and clay overburden, and helping shovels up steep grades. Its mechanical efficiency: 95%.

GRADES FOR AIRCRAFT FACTORY — Tournatractor, with 2½-yd dozer, grades for construction of an aircraft parts factory near Monmouth County Airport, Allenwood, N.J. With down-pressure attachment on blade, rig makes smooth cut over uneven ground. Owner is E. I. Brown, Allenwood.

BRING ON THE DIRT — 5 new C Tournapulls belonging to J. Robert Bazley Inc, Pottsville, Pa, line up for start of a 4-lane bypass around Hummelstown, Pa. For further information on any of these machines, write R. G. LeTourneau, Inc, Peoria, Ill.

Tournapull, Tournaracker, Tournacrane, Carryall—Trademark Reg. U.S Pat. Off., Tournatractor—Trademark Pic. 358-C

Continued from page 42

position he held until a change of administration in 1951.

Reindollar succeeds Paul B. Reinhold, president of the Atlas Equipment Co., Pittsburgh, Pa., who had been president for two terms.

The four regional vice presidents elected at this meeting include Charles M. Noble, chief engineer, New Jersey Turnpike Authority, Trenton, N. J., for the northwestern district; W. G. Pruett, highway director, Alabama State Highway Department, Montgomery, Ala., southern district; Julien R. Steelman, president, Koehring Co., Milwaukee, Wis., central district; and Harmer E. Davis, director, Institute of Transportation and Traffic Engineering, University of California, Berkeley, Calif., western district.

Moles Honor Kiewit and Palmer

Construction men from throughout the United States met in New York City Feb. 4 to honor Peter Kiewit of Omaha, Neb. and Edward P. Palmer of New York for "outstanding achievement in the construction field."

The occasion was the 13th annual award dinner of The Moles, national association of heavy-construction men.

• Peter Kiewit, center left, and Edward P. Palmer, center right, receive Moles' award presentations from George Ferris, left, and Richard Steers, right. Kiewit and Palmer were feted for "outstanding achievement in the construction field."

Kiewit is president of Peter Kiewit Sons' Co. which was the major contractor in the building of the air force's new Arctic base at Thule, Greenland, and recently was awarded the $1.2 billion contract for a new uranium plant for the Atomic Energy Commission in southern Ohio. Kiewit's firm also is building Garrison Dam in North Dakota, the world's largest compacted earth dam.

Palmer is president of Senior & Palmer of New York City. He has been prominent in building subways and deep bridge foundations in and around New York, and is a pioneer in "pneumatic foundations" — under water installations made with the aid of compressed-air chambers.

Presentations to Kiewit and Palmer were made by George Ferris and Richard Steers, New York contractors.

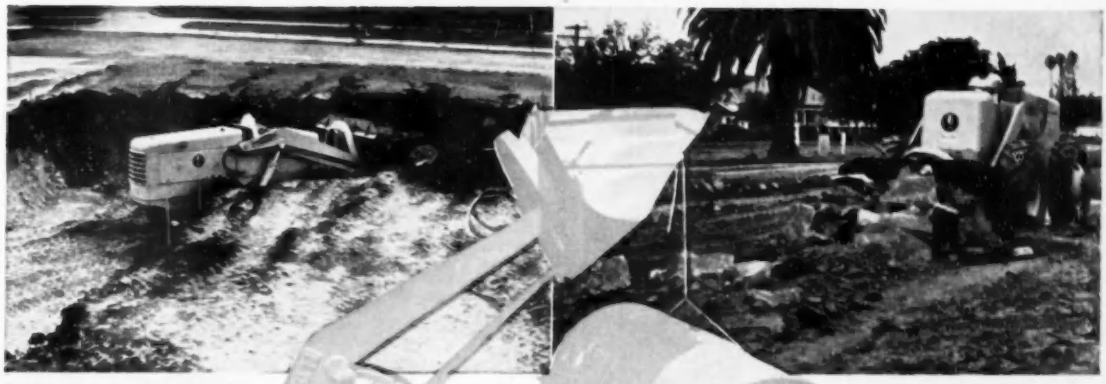
Inspectors Take Alaskan Refresher Course

Ninety Corps of Engineer inspectors on the Alaska defense program recently met in Anchorage to take an intensive refresher course. The action was in preparation for the 1953 outdoor work season which will set a record for construction activity.

The Alaska District inspectors face a broad and variable schedule of defense construction valued this season at many millions of dollars. Up to

Continued on page 52

PERFORMANCE BUILT . . . .
Omaha Dragline Buckets are tops in performance. Wedge shaped for easier loading and dumping. Perfect balance for smoother carrying and dumping. Smooth interior to reduce friction. That means Omaha Buckets are performance built. Available in four types. Send for catalog giving description and specifications.
OMAHA
DRAGLINE BUCKETS
DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.



CELLARS.. ..STREETS

..OR SEWERS

4-wheel-drive does a job

Amazing is the word for the variety of work that public works departments and contractors find for their 4-wheel-drive "PAYLOADERS." In fact, the range of uses of these versatile tractor-shovels is limited only by the ingenuity of their owners and operators.

Dig! Load! Backfill! Stockpile! Lift! Carry! Strip! Push! Pull! — all these job capabilities makes them one of the busiest machines on *any* project — and the most in demand. They drive quickly to work under their own power and they get around the job fast, too — on pavement and ground and over curbs and sidewalks without injuring them.

See one of these powerful, multi-purpose "PAYLOADERS" in action and you'll be amazed at what it can do, too. Your "PAYLOADER" Distributor is ready to give you complete facts. See him today, or write The Frank G. Hough Co., 708 Sunnyside Ave., Libertyville, Illinois.

WRITE

WRITE for full information on any of the "PAYLOADER" models: Four-Wheel-drive HM — 1½ yd. and HR — 1 yd.; Rear-wheel-drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; Front-wheel-drive Models HAH — ½ cu. yd., HA — 12 cu. ft.

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

HERE'S HOW M-R-S rubber tired versatility can pay off for you...

M-R-S 190 switches from scrapers to rippers, compacting rollers, machinery trailers, etc. in only minutes!

Make the most of your equipment investment by taking advantage of M-R-S greater production and versatility. Not only will you profit by outstanding self-loading production made possible by M-R-S exclusive WEIGHT TRANSFER, but also extra versatility that keeps all your equipment working. You'll save in another way, too, with M-R-S you can make the switch to high speed rubber using the four wheel scrapers you already own.

When there's ripping to be done, machinery trailers or compacting rollers to be powered, or other important utility work required, it only takes minutes to switch your M-R-S 190 from scrapers to other attachments right on the job.

If it's bigger profits you're after, you'll be wise to specify the M-R-S 190.

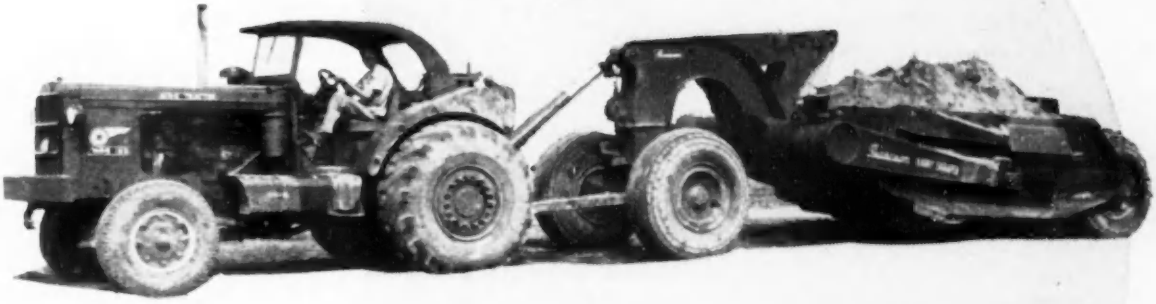
THE EMBLEM-
M-R-S
OF DEPENDABILITY

MANUFACTURING COMPANY

FLORA AND JACKSON, MISSISSIPPI, U.S.A.

M-R-S 190 WITH 275 H.P. **engine serves efficiently as prime mover for large machinery trailer.**

IN A MATTER OF MINUTES M-R-S 190 **switches from scrapers to a giant ripper right on the job.**



M-R-S 190 SELF-LOADS **12 yard struck scraper with 27540 pounds of clay loam soil in 150 feet and 90 seconds—by use of exclusive WEIGHT TRANSFER.**

LARGE 19.2 YARD STRUCK SCRAPER **is *Pusher-Loaded* to capacity with M-R-S 190 serving as prime mover.**

Does the wire rope you use earn this kind of TRUST?

Typical of many, one master mechanic says, "We *always* use Hercules Red-Strand wire rope, because we know we can trust it for long life and safe service . . . every time." An inspector reports, "On a work test, we really abused Leschen rope. It *more* than satisfied our requirements."

HERCULES Red-Strand deserves it

Why is that so? Simply because *higher-than-rated quality* in Red-Strand wire rope means *greater-than-expected* safety and performance.

If you're not getting this kind of praise from your men, you should try Hercules Red-Strand. Do it, next time you need wire rope.

HERCULES® Red-Strand wire rope made by A. Leschen & Sons Rope Company, St. Louis 12, Missouri

In business only to make wire rope . . . better wire rope . . . since 1857

HIGHER-THAN-RATED QUALITY

LESCHEN

WIRE ROPE AND SLINGS

A. LESCHEN & SONS ROPE COMPANY

DISTRIBUTORS IN ALL PRINCIPAL CITIES

News

Continued from page 48

date inspection methods and austerity policies serve as the purpose of the two three-day instruction courses provided March 4 thru March 7 and March 9 thru March 12 at the Anchorage office of the Corps of Engineers.

Top level engineers instructed in subjects which included inspector relations with the contractor, limits of inspector's authority, specific duties regarding roofing, necessity for acquaintance with details, legal aspects of inspectors' responsibilities, supply and property entanglements, safety requirements, specific duties for inspection concerning mechanical, structural electrical work and also concrete, excavation, pavement, painting, and earthwork.

Picture Mining Progress

How does the modern prospector find uranium with his Geiger counter? And how does his search compare with that of the old time gold prospector?

That's one of the interesting contrasts between old and new mining methods shown in a colorful educational movie just released by Gardner-Denver Co., of Quincy, Ill. *Pay Dirt*, as the new mining film is called, dramatizes the improved techniques which mining men and mining equipment manufacturers have developed for producing greater and greater tonnages of iron, copper, uranium, zinc, nickel, lead, and all the other minerals which are used so abundantly today.

One sequence contrasts back-breaking hand shoveling with modern machines for loading ore into mine cars —another application of compressed air power that has made the miners' work easier and has helped mine managers increase production.

Pay Dirt is a 16-mm. sound, color film that runs for about 30 minutes. It is one of a number of films on construction and mining subjects which are available from the Gardner-Denver film library, at no cost. Copies of these films, for showing at schools, association meetings, civic meetings, and other gatherings, may be obtained from Gardner-Denver Co., Quincy, Ill.

Report Concrete Tests

Hundred-year tests on the strength of concrete, now in their 43rd year in the University of Wisconsin College of Engineering, have so far revealed that some concrete and mortar mixes increase in strength with age.

Under present plans, the long-time

Continued on page 58

Today, more and more Big Red Teams are working in fleets. One of these Bucyrus-Erie Scraper and International TD-24 Tractor combinations sells another — and another, and another. Why not do as others have — see for yourself that B-Type Scrapers *load faster,* in *shorter distance* — that they get *bigger loads* with or without pushers — that they *haul more dirt, move it cheaper.* Ask your International Industrial Tractor Distributor for details.

BUCYRUS-ERIE CO. South Milwaukee, Wisconsin

• Five Bucyrus-Erie B-250 Scrapers pulled by International TD-24 Tractors excavating at steam plant site in Tennessee.

• Six B-type Scrapers and TD-24's on strip mining in England.

FLEETS OF BIG RED TEAMS WORKING Everywhere

• Three Big Red Teams — B-250 Scrapers and TD-24 Tractors — changing the channel of a river in Texas.

B-250

22 yd. struck, 27½ yd. heaped capacity.

B-170A

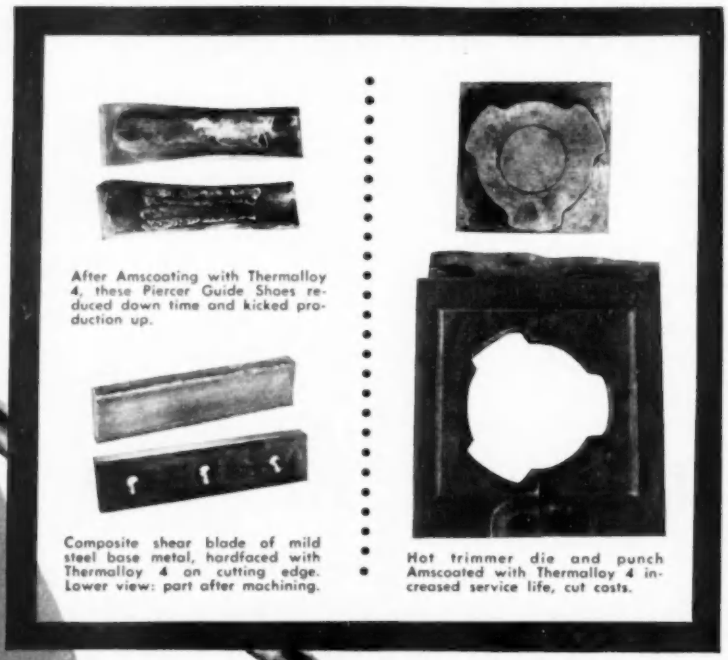
16 yd. struck, 21 yd. heaped capacity.

14T52C

BUCYRUS ERIE

See Your

INTERNATIONAL Industrial Tractor Distributor



After Amscoating with Thermalloy 4, these Piercer Guide Shoes reduced down time and kicked production up.

Composite shear blade of mild steel base metal, hardfaced with Thermalloy 4 on cutting edge. Lower view: part after machining.

Hot trimmer die and punch Amscoated with Thermalloy 4 increased service life, cut costs.

BEAT HEAT WEAR and IMPACT with AMSCO THERMALLOY 4

If you have a wear problem involving high temperatures and requiring resistance to impact, this new Amsco hardfacing electrode can save you time and money

Elevated temperatures are tough to cope with in situations involving thermal shock, metal-to-metal wear, hot gas corrosion, high temperature oxidation—especially when you need great impact resistance. Here's where Amsco Thermalloy 4 can step in and give you longer service life, and big savings in time and money.

Supplied as both a composite coated electrode for electric welding or as a bare cast rod for gas welding, both types deposit a high-carbon stainless alloy containing chromium and nickel as the principle alloying elements. In many applications, it can replace expensive nickel base alloy materials. Thermalloy 4 is packaged in 50-lb. boxes or in 10-lb. packages in 50-lb. boxes. For detailed analyses and other pertinent information, write for catalog sheet on Thermalloy 4 or contact your nearest Amsco distributor.

AMSCOATING

THE RIGHT WAY TO SAY HARDFACING

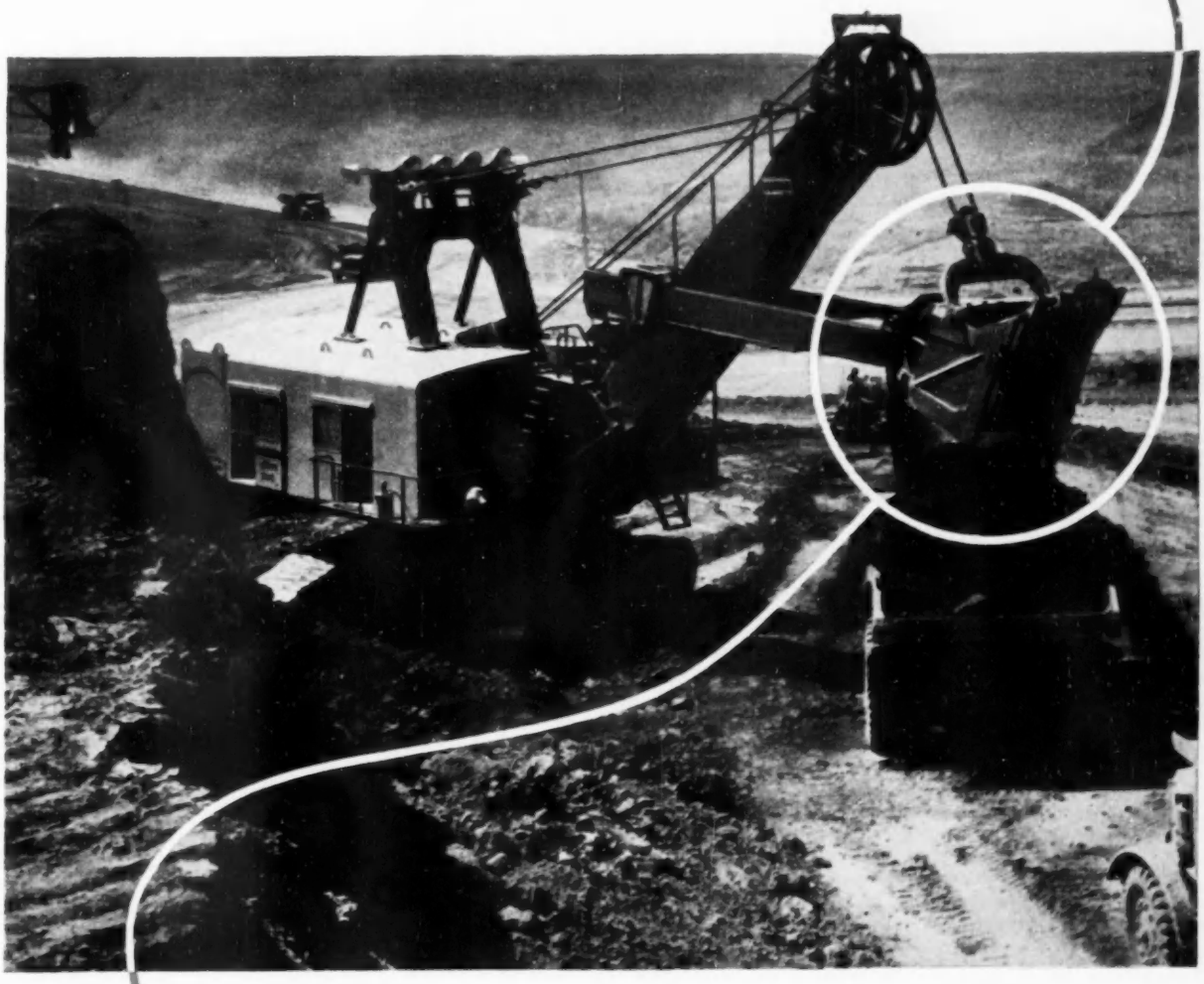
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

373 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd

IN BIG YARDAGE YOU CAN'T AFFORD TO BE WITHOUT



THE MARION 191-M

World's Largest Shovel on Two Crawlers
10 Cubic Yards
with small machine cycle speed and maneuverability
Ward-Leonard Electric or Diesel Electric

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

from ¾ cu. yd. to 45 cu. yds.

Equipment

You Ought to Know About

Trucks

Manufacturer: Ford Division of Ford Motor Co., P.O. Box 638, Dearborn, Mich.

Claims: Ford Division introduced the broadest line of trucks in the company's 50 year history when its 1953, all-new trucks went on display in Ford dealerships throughout the United States in March. The 1953 trucks will be offered in four distinct lines, in 20 new series, and in more than 190 models.

All of the new trucks will feature new, one-piece curved windshields—largest in their field—with swept-back pillar posts and 55% greater visibility. And the new F-100 Series of light duty trucks will be equipped for the first time with Fordomatic fully-automatic transmissions or automatic overdrive as optional equipment.

The 1953 trucks range from 4,000 lbs. to 27,000 lbs. GVW and up to 55,000 lbs. GCW ratings in the new F-900 Series, the largest truck ever built by the manufacturer and a 1953 addition to its truck line.

Features of all the 1953 trucks are the completely new "driverized" cabs and the elimination of double-clutching through use of new synchro-silent transmissions on all models. Also shorter wheelbases, wider front treads, and repositioning of springs make all trucks easier to handle and to steer, more maneuverable and with shorter turning radius.

Other important features are four-foot wide rear windows; new wider seats with five feet of hip room comfortably seating three men; exclusive counter-shock seat snubbers which absorb road shocks for a softer, smoother ride; greater ease of servicing all models; and either three V-8 or two 6-cylinder modern, high compression engines noted for their economical operation. Engines range from 101 to 155 hp.

Electrode

Manufacturer: Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.

Claims: The new Murex Type R electrode has been tried with good results on such applications as: Power piping, barge and tug boat construction, general fabrication of tanks and cylinders of various plate thicknesses, oil pipe lines, general shop welding, and repair work.

Small amount of spatter, uniformity of arc behavior, lack of spearing, ability to take high currents without coating breakdown or change of performance as electrode is consumed, penetration without undercutting, and lack of reaction pitting when using whip technique are some of the electrode features listed. These new electrodes are available from Metal and Thermit district sales offices and distributors who handle the Murex line.

Portable Crushers

Manufacturer: Diamond Iron Works, Inc., 1748 N. Second St., Minneapolis 11, Minn.

Claims: A new line of single pass, portable crushing plants is called the "100 Series." The three plants have capacities from 30 to 70 tph.

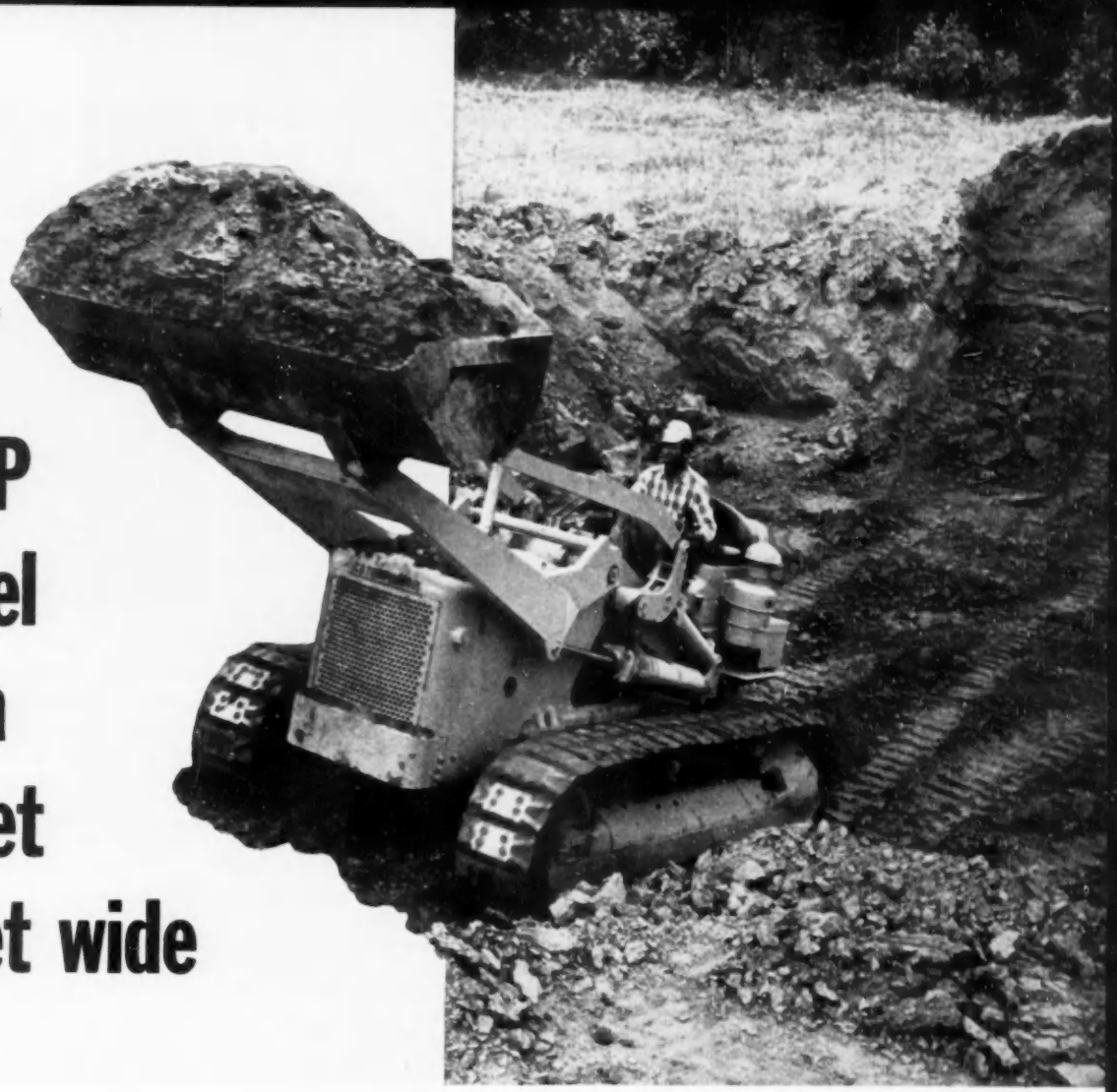
A new, low hopper height (10-ft. 4½-in.) gives greater ease of loading; a hinged delivery conveyor makes it unnecessary to dismantle for towing. Heavy duty steel grizzlies on the hoppers have openings designed for the highest crusher production with the minimum amount of scalping. Adjustable single eccentric plate feeders provide a constant, even flow of pit run to the scalping screens and plants proper. Hoppers are easily loaded with ½-yd. or ⅜-yd. shovels.

"Series 100" plants are: Nos. 116, 120, and 124. All are arranged for quick set-up and knock-down required by frequent moving to various job locations. A short wheel base and specially positioned towing tongue make them completely maneuverable on the road or in the pit.

Compactly designed, the plants have

Continued on page 59

New CAT* 66 HP Shovel has a bucket 8 feet wide



This is the new Caterpillar No. 6 Shovel. A glutton for work on construction jobs, it excavates, stockpiles, strips, loads, 'dozes, backfills and handles cleaning, grading and landscaping chores. Here, take a close look:

The shovel frame and tractor are welded and bolted together. This is *one* unit — big, tough and completely Caterpillar built.

That bucket is 96 in. across, scoops up 2 cu. yd. easily, and has 66 HP behind its hard-faced cutting edge of high-carbon steel. There's a 35° automatic tip-back which holds the load in the bucket, and a 50° dump angle, with impact shaking, to get rid of even the stickiest material quickly and cleanly.

The bucket is wider than the widest part of the tractor. You can work close to walls, and cut sidewalls clean, with this shovel.

Those crawler tracks are extra long and designed especially for this unit. They're non-oscillating, too, for added stability and finer grading.

The Caterpillar-built hydraulic system lets the operator raise and dump at the same time and features an automatic kick-out. And the operator sits high and clear, with excellent visibility of the bucket's sides, back and corners. Yet the unit's over-all height (6 ft. 11 in.) is low enough for working in tight places and low overhead areas.

Your Caterpillar Dealer is anxious to demonstrate the No. 6 Shovel for you. Give him a call.

Caterpillar Tractor Co., Peoria, Illinois

CATERPILLAR*

*Both Cat ..nd Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

Continued from page 52

tests on the curing and aging strengths of concretes and mortars will continue until the year 2023. The Wisconsin tests, however, have already given engineers early reliable information.

The tests show that over the first 43 years, concrete stored outside, where it is subject to all kinds of Wisconsin weather, becomes more than three times stronger than it was during the first days of its hardening before World War I.

The products have been curing and aging under these conditions: Outdoors, in a cellar, and indoors in water. Under the test, the compressive strengths of concrete increased when cured unprotected outdoors.

Widen Quebec Canal for Power Needs

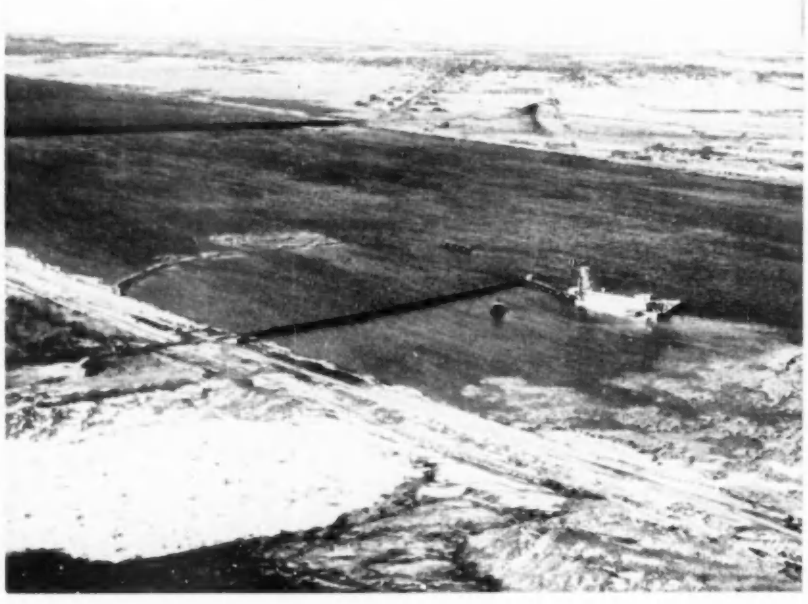
A large hydraulic pipe line dredge, the "Hydro-Quebec," has started work in the Beauharnois Canal, Quebec, Canada. The dredge is deepening and widening the canal to provide the volume of water necessary to operate the expanding facilities of the Quebec Hydro-Electric Commission, province owned organization controlling Beauharnois Light, Heat and Power Co.

When completed the Beauharnois powerhouse installation will be the largest single site hydro-electric plant in the world, with electrical output production of more than two million horsepower. It is now practically two-thirds completed.

The 15-mile long Beauharnois Canal between the towns of Valleyfield and Beauharnois is the life-line of the Beauharnois Power Plant. Eventually it will divert practically the entire flow of the St. Lawrence River.

Included in the canal's 3300-ft. width is a navigation channel 600 feet wide and 27 feet deep through which ocean-going vessels will easily find their way. Provision has been made to install locks at the dam, making the canal an integral part of the proposed St. Lawrence Waterway.

The "Hydro-Quebec" will remove an estimated 40 million cubic yards of boulder clay from the bed of the present canal. The giant hydraulic dredge was designed by the Ellicott Machine Corp., Baltimore, Md.

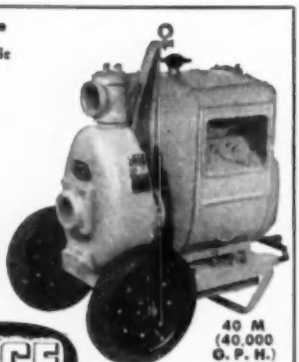


• Hydraulic dredge *Hydro Quebec* begins task of taking 40 million yards of clay from Beauharnois Canal, Quebec, Canada. Canal widening and deepening will bring volume of water to new hydro-electric plant.

J. B. McLellan

J. B. McLellan, 78, co-owner with his seven sons of the McLellan Stone Co., died January 19 after an illness of several weeks. Mr. McLellan entered the road building field when in 1922 he formed a partnership with his two sons to build highways in Kentucky. This partnership terminated two years later and Mr. McLellan then formed another partnership with the late Wade Campbell to grade and drain highways. This partnership was dissolved in 1943. In 1944 Mr. McLellan formed a partnership with six sons in the crushed stone business with one quarry at Horse Cave, Ky. In 1947 another quarry was located near Bowling Green, Ky. In 1951 a plant was installed near Scottsville, Ky. and another plant set up in Brownsville, Ky. in 1952. Each plant was managed by one of Mr. McLellan's sons.

Available with Pneumatic Tires Tires, Steel Wheels or Skids



40 M (40,000 G. P. H.)

RICE

Self-Priming

CENTRIFUGAL PUMPS

Engine, belt, and electric driven pumps with many new features to give you low cost, dependable performance. A. G. C. rated. Easily replaced wearing parts keep Rice Pumps young at low cost.

Write for special bulletins.

RICE PUMP & MACHINE CO.

234 N. 12th Ave. Grafton, Wis.

New Equipment

Continued from page 56

fully guarded drives and each has an operator's platform permitting an entire view of the plant. The platforms also permit easy access to the power units for starting and servicing.

Each plant has a 1½ deck oversize vibrating screen and roller bearing jaw crusher. No. 116 has a 10-in. x 16-in., No. 120 a 10-in. x 20-in., and No. 124 a 10-in x 24-in. jaw crusher. Capacities based on 25% oversize passing a one-inch screen are: No. 116—30/40; No. 120—40/55; and No. 124—55/70 tons per hour.

Other outstanding features include choice of mechanical or air brakes; centrally located controls; light weight; low traveling height.

60-Ton Truck

Manufacturer: Dart Truck Co., 2621 Oak Street, Kansas City, Mo.

Claims: Specifications of the new 60-ton Model 600 truck give the best account of the progress made in large truck design.

The Model 600 has an overall length of 32-ft. 6-in.; an overall width of 11-ft. 8½-in.; and an overall height of 11-ft. 6-in. Truck weight is registered at 240,000 lbs.

Two Buda Diesel engines power the mammoth carrier (total, 700 hp gross). Each engine is connected to a rear axle through separate torque converters.

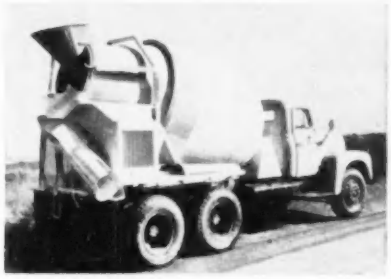
Torque converters are twin-disc three stage with 5 to 1 torque multiplication and down-hill brake features. Each torque converter is charged with Diesel fuel which is supplied from the fuel tank. This fluid is the working media through which the converter transmits energy.

Twin double acting hydraulic boosters provide 56,000 lbs. steering effort.

Front axle has 85,000-lb. capacity. It is cast of high-alloy steel. Center pivot allows axle oscillation over irregular terrain.

For the tandem rear axles there is also an 85,000-lb. capacity for each. They are also cast of high alloy steel. Overall reduction of axle may be 12:-57:1, 15:23:1, or 20:6:1 to provide ratios for complete coverage of operating condition.

Hydraulic system is operated by two vane type hydraulic pumps which pump a total of 144 gpm at 1,000 psi. Hydraulic system is used for power steering and for hoisting the body. A hydraulic pump is connected to each engine; the system is active with one engine stalled.



Concrete Mixer

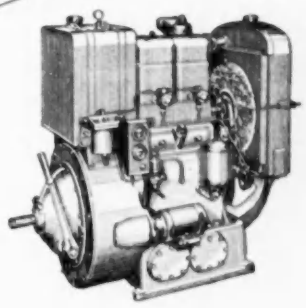
Manufacturer: Willard Concrete Machinery Sales Co., 11700 Wright Rd., Lynwood, Calif.

Claims: A new six to 7¼ cubic yard concrete mixer features movement of the center of gravity to a point which allows greater payloads while still maintaining legal distribution of the weight on the truck's axles.

Mixer is suitable for mounting on ten-wheel trucks with 175-in. wheelbase. Power for the drum is furnished by a transverse-mounted, 93 hp Ford OHV Industrial six and basic Ford power transmission assembly.

Overall gear ratio through the transmission and final chain drive is 281 to one. With engine in rear, the main

There's no limit to "WORKING HOURS" for a NORDBERG DIESEL!



. . . they're built better to last longer

No "9 to 5" routine for Nordberg "4FS" series Diesel engines . . . they're built to stay on the job around the clock—day in and day out. Using sturdy, heavy duty construction throughout, these conservatively rated units are your best buy for the toughest kind of power jobs . . . in construction, oil field, irrigation, power plants, marine service and scores of other power requirements.

Built in 1, 2 and 3-cylinder models, these reliable, low cost Nordberg Diesels are available as power units in sizes from 10 to 45 hp; as generator sets from 6 to 30 kw; and as pumping units in capacities from 200 to 3,000 gpm at 15 to 240 ft. total head.

And remember—Nordberg Diesels are backed by over 60 years' experience in the design and construction of heavy duty machinery for the world's industries. Clip the coupon for full details.

NORDBERG MFG. CO., Milwaukee, Wis.

NORDBERG
BUILDERS OF AMERICA'S LARGEST LINE OF HEAVY-DUTY DIESELS

--MAIL THIS COUPON TODAY--

Nordberg Mfg. Co., Milwaukee, Wisconsin

Send catalog covering Nordberg Type 4FS Diesels. I am interested in a unit for the following service:

Your Name

Company Name

Address

City Zone State

4-153

weight of the concrete is thrown far forward to equalize axle loads.

Construction of the mixer's frame is unusually strong and the drum itself is stiffened by two continuously welded overlapping mixing spirals. Both charging and discharging hoppers are designed with large collecting areas. The folding chute is made of ⅛-in. steel and extends 8-ft. 6-in. from the swivel center. A 4-ft. extension is mounted on the fender.

Ninety gallons of water are carried in a front mounted combined pedestal and tank with outlets for mixing and washing. A ¾-in. gear-type water pump is driven by V-belt from the mixer engine. Prompt inexpensive maintenance is guaranteed by the usual availability of Ford parts.

Improved Earthmover

Manufacturer: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

Claims: Gradall, multi-purpose earthmover and construction machine, is now being supplied with a new undercarriage. The carrier provides the balance to make the entire unit tip-proof without the need for outriggers.

The new carrier's wheel base is 18% shorter than has hitherto been available, making for maximum maneuverability. Wheel base is now 162 inches, carrying a frame 244¼ inches in overall length. Chassis weight is 12,550 pounds. The frame is ruggedly constructed of extra-heavy 8-in. x 10-in. H-beam having a section modulus of 40 pounds. Gross vehicle weight is 40,000 pounds.

The engine used in the new undercarriage is a 427 cubic inch L-head unit developing 140 hp at 2800 rpm. An oversize radiator is used to insure ample cooling even when running idle at high ambient temperatures. A 13-in. vibration-dampened clutch is incorporated in the design, as are Timken axles and Bendix-Westinghouse air brakes.

"SAFETY FIRST" and Tournarope go together

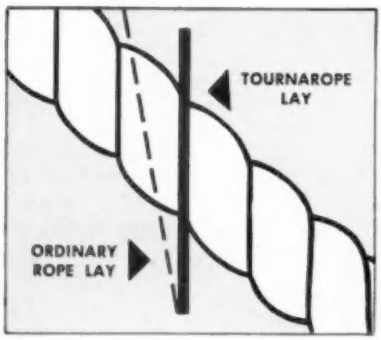
Tournarope is a *safer* wire rope to use because it has 7% shorter lay and more steel per foot. As a result, pre-formed Tournarope offers these "Safety First" advantages:

1. Stands up under severe flexing. Built with a flatter twist, Tournarope has more "spring" action, absorbs "shock load" more easily.

2. Resists crushing and kinking. Shorter lay and flatter twist of pre-formed Tournarope gives a harder structure that better withstands crushing and kinking.

3. Safer to handle. Tournarope is pre-formed. Broken surface wires do not tend to snap outward to cut hands or tear clothing.

4. Lasts longer. The 7% shorter lay, more steel per foot, and harder structure add up to longer life service for Tournarope. That's safety first for your pocket book. Your annual rope costs will be lower.



Says a Tournarope user: "Twenty-one months ago I got a new tractor with new LeTourneau Power Control Unit and Scraper. I threaded it with Tournarope and to date am still using the same cable."

So play it safe with Tournarope. For price quotation, write your name, address, and rope specifications in the margin of this ad. Clip it out and send to . . .

Tournarope—Trademark Reg. U.S. Pat. Off. W-365-G-e

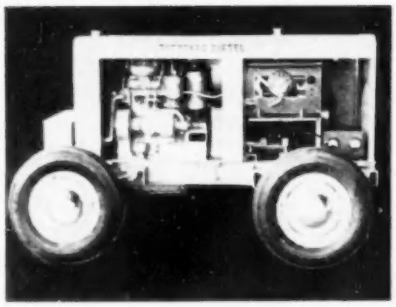
R. G. LeTOURNEAU, INC. Tournarope Division PEORIA, ILLINOIS

Small Arc Welders

Manufacturer: R. H. Sheppard Co., Hanover, Pa.

Claims: A new line of small portable arc welders, powered by their simplified Diesels, is now being introduced.

These are the first arc welders of 200, 300, or 400 ampere capacities to



be powered with a Diesel. Smallest of the arc welders, including the Diesel, is 45⅝ inches high, 27½ inches wide, and 63½ inches long on a skid base.

Welders are built as integral units mounted on four-wheel trailers and are ready for instant use upon delivery. Models are also available mounted on steel I-beam bases.

The welder features a multi-V belt drive which steps up the generator speed to 3500 rpm. This permits use of a smaller generator and power unit

to equal the output of larger, direct drive sets . . . also offers the advantages of a smaller, more mobile unit. The V-Belt drive provides smooth transmission of power from engine to generator.

Concrete Vibrator

Manufacturer: Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill.

Claims: Recently completed by the

manufacturer is a self-contained, one-man vibrator operated by a 2 mgv gasoline engine. Designed for faster, easier narrow form vibrating from catwalks, its 5 hp, 21-pound engine is easily supported with the fingers.

Hand Cleaner

Manufacturer: Magnus Chemical Co., Inc., 3 Kreie St., Garwood, N. J.

Claims: A new hand cleaner can be used where water is not convenient or available. This product is also water soluble. It rinses thoroughly, leaving dirty hands clean, with no oily residue.

The hand cleaner removes grease, paint, tar, grime, and inks including litho and stencil. A white stiff jell containing a generous amount of Lanolin, it has no odor of solvent or ammonia.

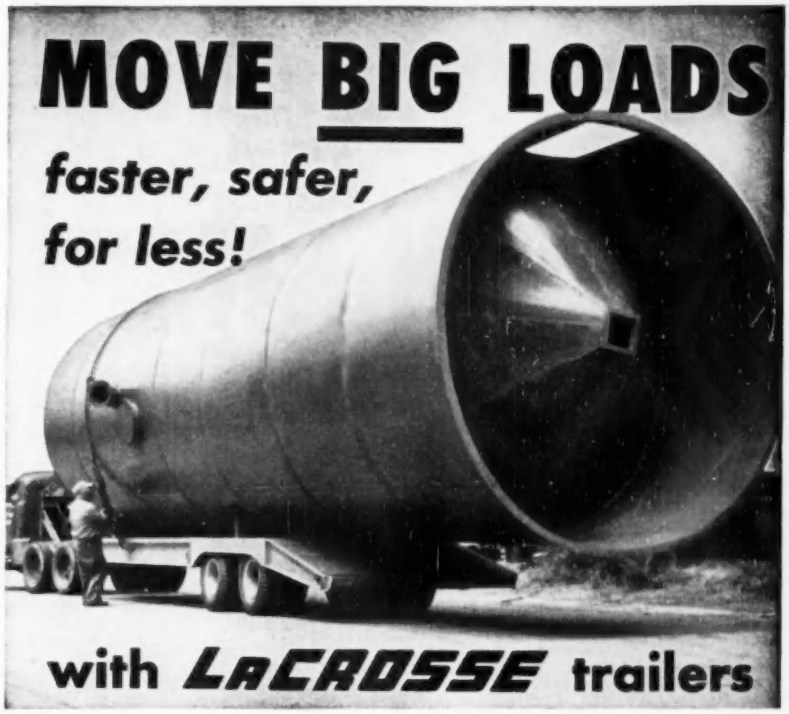
When water is not available it may be wiped off with a towel, leaving the hands soft, without a tacky feeling. Containing no alkali, it is neutral in its reactions and will not irritate or dry out the skin.

Bulldozer

Manufacturer: Baker Manufacturing Co., 524 Stanford Ave., Springfield, Ill.

Claims: The hydraulic (no-push-beam) 96-in. wide bulldozer is designed for use with the Allis-Chalmers

Continued on page 64



To save costly delays and special handling charges, this ingenious contractor simply drove his La Crosse flat bed *right into the manufacturers' plant* under this huge 12½ ton ready-mix storage silo — lashed it securely into position — and drove it away in a few minutes. You, too, can save time, trouble and money by *doing your own equipment hauling* on job-proved La Crosse trailers. Choice of flat, drop, or tilting platforms—6 to 67 tons capacity. Write for free descriptive literature.

Up to 2000 lbs. less dead weight per trailer.

Stronger goose-neck construction.

Safer, more dependable brakes.

Stronger specially-built axles.

LC-22

Check Today!

LA CROSSE TRAILER CORPORATION, La Crosse, Wis.

☐ Rush complete information on La Crosse trailers:
☐ Specifications ☐ Prices ☐ Delivery
☐ Send name of nearest La Crosse Distributor.
☐ We may buy a ..... ton trailer about .....
(date)

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Employed by.....
Address.....
City.....State.....

LaCROSSE
America's Favorite LOW BED TRAILER

Now...

DESIGN SIMPLICITY

Most

counts more than ever . . .

and it's yours with BUCYRUS ERIE *excavators*

From boom point to treads, the advanced engineering of Bucyrus-Erie excavators shows up in neat simplicity all along the line. They're trim and compact, have no excess weight; this means easy handling, fast operating. With lightness they combine great strength; this means low maintenance, real dependability. Machinery is conveniently arranged, accessible; this means it's easy to keep a Bucyrus-Erie in top working condition.

This basic design simplicity pays you extra dividends in big output and long service life. Today, with critical materials for new equipment in short supply, that's more important than ever.

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HOW TO MAKE YOUR EXCAVATOR WORK HARDER . . . LAST LONGER

Write now for a new 32-page booklet loaded with valuable hints on:

- Preventive Maintenance
- Lubrication
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SOUTH MILWAUKEE, WISCONSIN

½-TO-4 YD. GASOLINE, DIESEL, SINGLE-MOTOR ELECTRIC EXCAVATORS
HYDROCRANE-HYDROHOE

Compared - Most Preferred

New Equipment

Continued from page 61

HD-15 crawler tractor. The dozer is designated 15X.

A simple mounting-lifting mechanism is responsible for elimination of pushbeam in the 15X, as well as a predecessor, the 9X.

The tractor main spring has been removed, and the entire front tractor frame and integrally bolted dozer at-

tachment is supported by powerful twin hydraulic cylinders. Stabilizer bars connected to the hydraulic pistons and running from track to moldboard absorb torsional strain and reduce horizontal forces on the tractor frame.

Above and behind the 51-in. high moldboard, the 15X's protective radiator cover is hinged to open outward, and permits easy access to the hydraulic control mechanism which is front-mounted.

The 15X is the exact width of a standard highway trailer. It can be transported over highway day or night, with special width permits.

The 15X maintains favorable center of gravity with its blade in either its highest or lowest position, just ahead of the third roller from the front idler. This permits use for draw bar work with blade left on, without undue wear on the front end truck bearings . . . and providing better traction under all conditions. No special tools are required to remove the blade.

The dozer blade weighs only 5366 lbs. due to a saving of almost 1400 lbs. of steel in its simplified design.

Oil reservoir and hydraulic pump are front-mounted on the 15X to provide quicker, more positive pressure—and permit easy servicing of hydraulic components.

Trailer Dump

Manufacturer: Galion Allsteel Body Co., 605 S. Market St., Galion, O.

Claims: A new 20-ft. long, 20-cubic yd. capacity package trailer dump is known as heavy duty Model 12. The body has 16-yd. sides and 20-yd. ends with a semi-bay front.

Dumping is handled by a 77380 hoist. This consists of two 3-section 7-in. telescopic units. Rated hoist capacity is 22 tons.

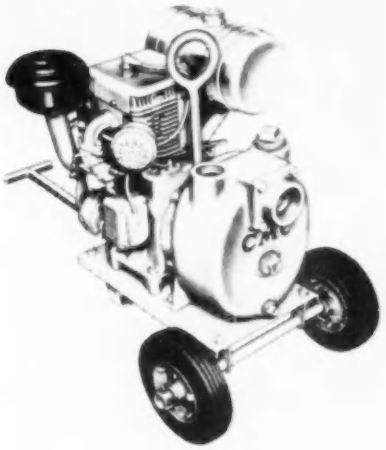
The tandem axle trailer has a specially designed heavy duty dump trailer suspension. Trailer utilizes a

straight top frame with ample section and roll to support the most rugged operation. It is available with either hose operation or power fifth wheel, as desired. Tire sizes and brakes are available in several options to meet load and service requirements.

Self-Priming Pump

Manufacturer: Construction Machinery Co., 1939 Loveall St., Waterloo, Ia.

Claims: A new portable self-priming centrifugal pump is available in four sizes and seven models, all of which are powered with air-cooled engines. The sizes cover ranges from 1½ inches through four inches.



The self-priming feature is the result of dual volutes. Pump cases are of the one-piece type and are self-cleaning, utilizing the sweeping action of the liquid to clean and remove solids from the pump case.

At the point where the rotating impeller shaft enters the pump case, a rotary shaft seal is used in place of a conventional stuffing box. This rotary shaft seal is of the greaseless type requiring no lubrication, and the seal is protected from abrasive particles by a hydraulic seal at the rim of the impeller.

In the design and construction of the new pump, particular attention was given to reducing the number of parts and to effect savings in weight. Compared with previous models, the parts used have been reduced about 50% and the weight savings average 25%.

Close coupled assembly provides a compact, portable unit and the pump has been arranged so it is easily dismantled for service or inspection. These pumps carry the CMC trade name Dual-Prime and are furnished either mounted on rubber tired wheels, or on a skid type base.

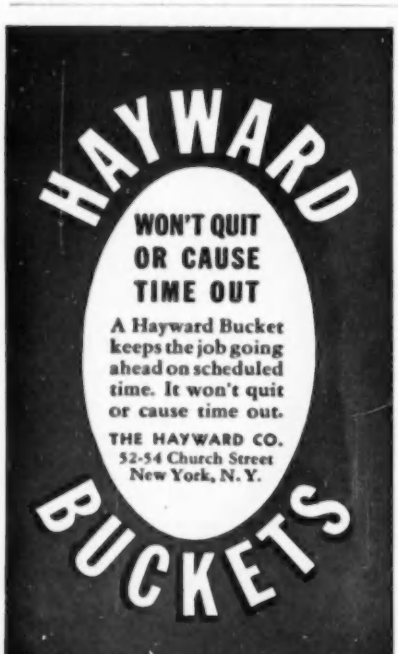
Multi-Purpose Grease

Manufacturer: Shell Oil Co., 50 W. 50th St., New York 20, N. Y.

Claims: Exceptionally high resistance to breakdown is one of the basic characteristics of Alvania grease, a lithium base product whose unique multi-purpose properties are attributed to the use of lithium 12-hydroxy stearate.

Mechanical stability was indicated when this grease withstood over a million strokes in an A.S.T.M. motorized worker test, without loss of body.

Other Alvania properties combining to make true multi-purpose application possible are its high water tolerance (where it has been known to


HAYWARD
WON'T QUIT
OR CAUSE
TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS

maintain peak consistancy and lubricating qualities with as much as 32.5% water present); its broad temperature range, achieving high pump-ability (for automatic grease systems) and movement at low temperatures, and undergoing no phase change as temperature rises to the high melting point; its low rate of oxidation and long induction period, and its excellent storage stability.

Its adaptability to extreme water conditions is greatly extending the field of application.

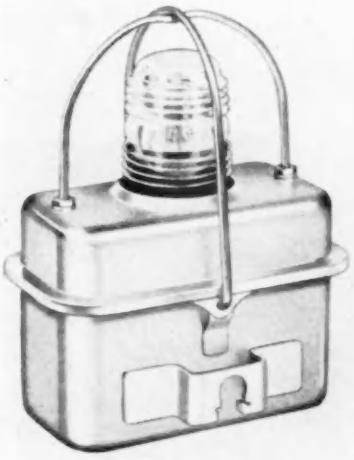
Savings made possible by combining these properties in one type of grease are reduced grease consumption, elimination of misapplication, reduced inventory, (replacing as many as 20 different greases), more simplified purchasing and storage, reduced downtime, application cost and maintenance, and substantially increased bearing life (as high as 90% under severe conditions). Because it stays in bearings longer, relubrication periods can be substantially extended.

Warning Signal

Manufacturer: Emarco Corp., P. O. Box 615, Far Hills Station, Dayton 9, O.

Claims: The new Thoro-Flare emergency warning signal, Model AW-C, is especially designed for use on barricades.

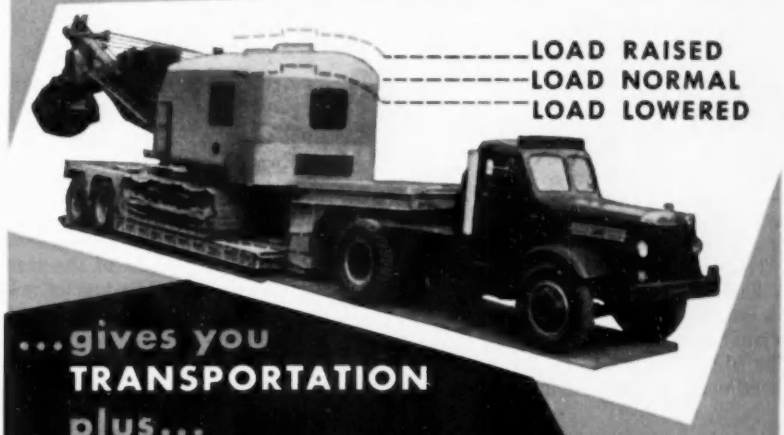
Model AW-C is constructed with a permanently fastened mount. It is mounted so that light is above the barricade—visible from all directions. Thoro-Flare is attached to the barricade by a bolt and lockwasher requiring the use of a tool to detach; thus preventing casual theft.



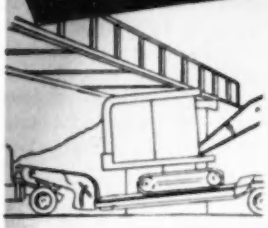
Thoro-Flare starts to flash instantly when placed in upright position. It can be turned to off position by loosening mounting bolt.

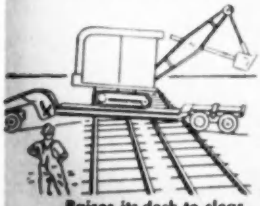
Neon flasher unit is fired by a sealed

Only ROGERS TYPE "TPG" Power Lift
DETACHABLE GOOSENECK



...gives you TRANSPORTATION plus... LOAD MANIPULATION


Stoops to clear low overhead obstructions.


Raises its deck to clear high banked crossings.

The unique deck raising and lowering feature of this Rogers trailer makes load manipulation a distinct advantage under many hauling conditions.

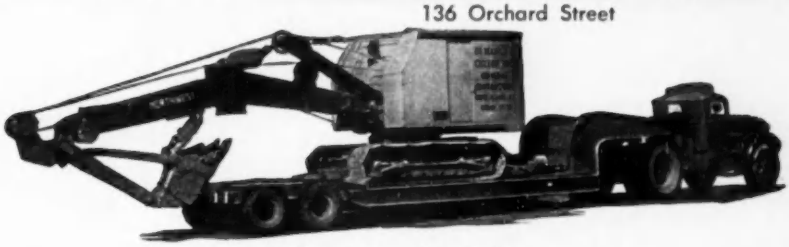
Low bridge or high road bed obstacles are easily overcome. Deck is raised or lowered to alter overall height of load for overhead clearance. Raising deck clears high road beds.

Write for literature and full particulars or call your nearest agent.

THE ROGERS Power Lift DETACHABLE GOOSENECK CAN BE OBTAINED ON ANY STANDARD ROGERS DROP DECK TRAILER

EXPERIENCE builds 'em PERFORMANCE sells 'em

ROGERS BROS. CORP.
ALBION, PENNA.
136 Orchard Street



A Rogers Type "D" Trailer

Export Office: 50 Church St., New York 7, N. Y., U. S. A. Cable Address: Brosites

power pack unit which also embodies a Mercury switch and electronic flasher. Neon tube is rubber mounted and shock-proof. Red Fresnel lens and rust resistant metal case are sealed against dirt and moisture. The unit is eight inches high, six inches long, and 3½ inches wide. Weight complete with battery is six pounds.

Alloy Steel Trailer

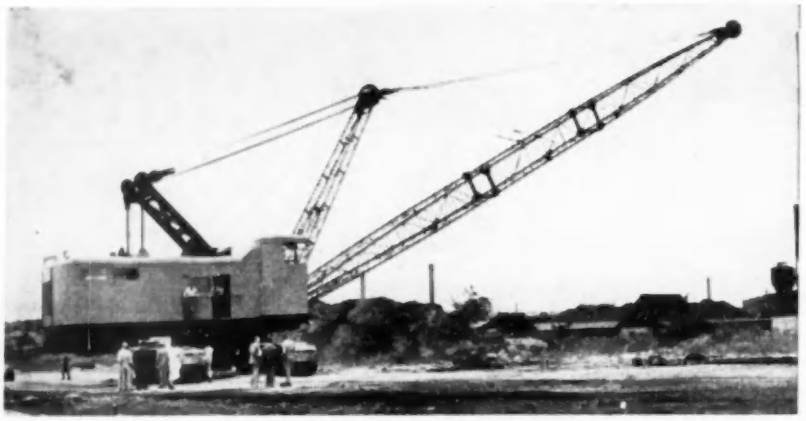
Manufacturer: Martin Machine Co., South St. and Thomas Ave., Kewanee, Ill.

Claims: The Model R4TL is built throughout with high strength alloy steel. The trailer weighs less than 8000 lbs., yet has a payload capacity of 27 tons.

The trailer was primarily designed to haul equipment in the Caterpillar D8 weight class, and still remain within legal axle load limits in most states. The high strength alloy steel has reduced dead weight to a minimum. The

frame, fabricated of structural members, is electrically welded into a unit of immense strength.

Field tests were made, using a Caterpillar D8 tractor equipped with a



cable-controlled dozer, canopy, and side hoods. Extremely muddy conditions increased the weight of the tractor to 51,640 pounds. The tractor was loaded over the rear and the dozer was rested on the gooseneck.

Recorded weights on a registered scale showed 4920 pounds on the truck's front axle; 31,320 pounds on the truck's tandem; and 31,820 pounds on the trailer tandem. The truck itself weighed 8640 pounds.

The trailer has an 8 x 13-ft. platform, with an overall length of 27-ft. 7-in. from kingpin to extreme rear. This trailer also features the patented Martin tandem axle assembly—a full oscillating assembly mounted on neoprene for operation with no moving parts to wear out and no lubrication required.

Dragline

Manufacturer: Harnischfeger Corp., Milwaukee, Wis.

Claims: The new Model 1855 is reportedly the largest dragline to be mounted on a single pair of crawler frames.

The heavy-duty dragline has a working weight of 600,000 lbs. and is capable of handling an 8-cubic yard bucket with a 120-ft. boom or a 7-cubic yard bucket with a 150-ft. boom. It is powered by an eight-cylinder Cooper-Bessemer FV8 Diesel engine which develops 590 hp at 900 rpm.

Maximum height of the new model is 32 feet, with the cab top slightly more than 19½ feet above the ground. Distance from the ground to the bottom of the counterweight is almost 5½ feet.

The giant dragline develops ground pressure of 16.2 psi. Overall width of its crawlers, with their 60-in. shoes, is 22½ feet while the crawler length is 29 feet.

The Model 1855 features four separate Magnetorque units which control all operations of the dragline. Digging, hoisting, swinging, and propelling movements are governed by electro-magnetic controls which have eliminated friction clutches entirely.

Additional data reports a hoist line speed of 246 fpm and a digging line speed of 199 fpm. The hoist line pull is 75,600 lbs. and the digging line pull 93,500 lbs. Traveling speed is listed at .5 miles per hour while its rotating speed reaches 3.54 rpm.

Engine HP Increase

Manufacturer: Cummins Engine Co., Inc., Columbus, Ind.

Claims: Increase in horsepower rating of the HRBB-600 and HRBBI-600 engines has been announced by the manufacturer. Power has been stepped-up from 175 to 180 hp at 2000 rpm, with no increase in engine weight.

Truck Tire

Manufacturer: United States Rubber Co., Rockefeller Center, New York 20, N. Y.

Claims: The all-new U. S. Royal Fleetway is a tire embodying radical improvements in truck tire manufacture. It has been designed to reduce

RENT INTERLOCKING STEEL SHEET PILING
"FASTER from FOSTER"
ALL LENGTHS & ALL SECTIONS TO MEET ALL YOUR JOB NEEDS
Foster's lower rental rates on all standard piling sections give you a low fixed expense as an added competitive advantage when bidding on jobs. You can always count on reliable service! RENT: Pile Hammers and Extractors.
Write for New Piling Catalog EE4
L. B. FOSTER CO.
PITTSBURGH 30, PA. CHICAGO 4, ILL.
NEW YORK 7, N.Y. HOUSTON 2, TEX.

road failures and to give up to 41% more original tread miles than previously realized in tires sold at regular prices.

Developed in U. S. Tire laboratories under four exclusive patented processes, the new tire sharply reduces groove cracking, a principal headache of truck operators. In this process the new tire is exposed to intense and penetrating infra-red rays to toughen the grooves. The Micro-Mix tread is compounded in a new, hot process that homogenizes all elements of the tread in perfect dispersion.

Rayon cords are solutioned in a special plastic resin to insure that the rubber coating will bond permanently to the cords and insulate them to prevent chafing each other. A newly developed chemical has been used in sidewall compound to guard against weather checking.

Other features of the new truck tire are a wider center rib with narrow outer ribs, heat resistant ventilated shoulders, and a five-row rib design up to and including 10-in. cross section. Above this size a seven-row design is used. Double shock pads impregnated with tread rubber are bonded permanently to the carcass by thousands of tiny rubber "rivets" to prevent tread separation.

Steel bead wires in the Fleetway are bronze plated to prevent corrosion before being insulated with rubber.

The new tires are designed with a flatter road level profile to put more working rubber on the road, and they are interchangeable for all truck or trailer wheels, single or dual.

Welding Electrode

Manufacturer: General Electric Co., Schenectady 5, N. Y.

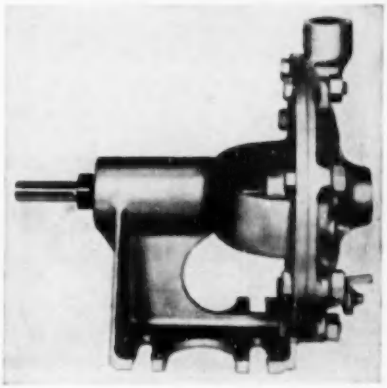
Claims: A new general-purpose mild-steel welding electrode has been designed for optimum flexibility of application with reduced operator effort. Designated as G-E Type W-610-A, the new electrode is a dc reverse-polarity rod meeting AWS Class E-6010 specifications.

The electrode facilitates butt, fillet, lap joint, and edge welding in all positions. Its ability to take high currents, together with freedom from reaction pitting, fingernailing, spatter, and blistering of the coating, assures a high ratio of inches-of-welding to inches-of-electrode used.

Reversible Pump

Manufacturer: Gardner-Denver Co., Quincy, Ill.

Claims: A new centrifugal pump which operates with equal efficiency



when rotated in either direction is known as the Gardner-Denver Model CAY. The pump was designed primarily for circulating cooling water in air compressors, Diesel and gasoline engines, and other water-cooled machines.

Advantages of the reversible Model CAY are said to include easy installation in any position on a machine, simplified piping design, and adaptability to any type of drive. The Model CAY, the manufacturer states, has successfully been installed on either side of the same machine without turning the pump around when moving it from one side to the other.

The new Model CAY is suitable for

Continued on page 70

WELLMAN *Williams Type*

FAST BUCKET OPENING SPEEDS OPERATIONS

• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

Want Facts?

Write for free descriptive bulletins.

CLAMSHELL • DRAGLINE
CUSTOM-BUILT BUCKETS
STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

JOHNSON *big-payload* CLAMSHELLS

Fast-cleaning

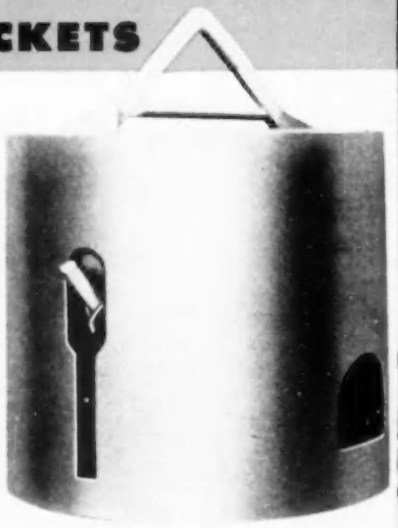
. . . smooth, inside and out, Johnson all-welded clamshell buckets dig and dump with least resistance. They are quick-filling, easy-closing because big needle-bearing-mounted sheaves reduce friction loss, deliver full digging power to lips, teeth. Hard manganese cutting edge toughens with use, assures a full capacity payload every bite.

3 TYPES, 10 SIZES . . . ⅜ to 3 YDS.

General-Purpose, Wide-Rehandling, Heavy-Duty-Digging types . . . 10 sizes from ⅜ to 3 yards, offer maximum yardage performance, extra long bucket life for all of your material-handling jobs.

Finger-tip controlled CONCRETE BUCKETS

Available in ½, 1, 1½ and 2 cu. yd. sizes, Johnson Finger-Tip Control concrete buckets are ideal for normal slump concrete of average-size aggregates. Smooth-welded, sloped interior gives fast, complete discharge. Double-clam discharge gates with toggle lock is single-lever operated. Gate also is counter-weighted for self-closing. Other sizes, types include: 1 to 4-yard Johnson-Dravo buckets, hand-wheel operated . . . and 2 to 8-yard Johnson Lo-Slump buckets with manual or air-ram controls, built-in vibrator for handling stiffest concrete. Write for catalog.



8-page bulletin gives you all the facts on Johnson Clamshells.
Write to: C. S. JOHNSON Co., CHAMPAIGN, ILL.

NAME _____

COMPANY _____

STREET _____

CITY, STATE _____

☐ Also interested in details on Johnson concrete buckets.

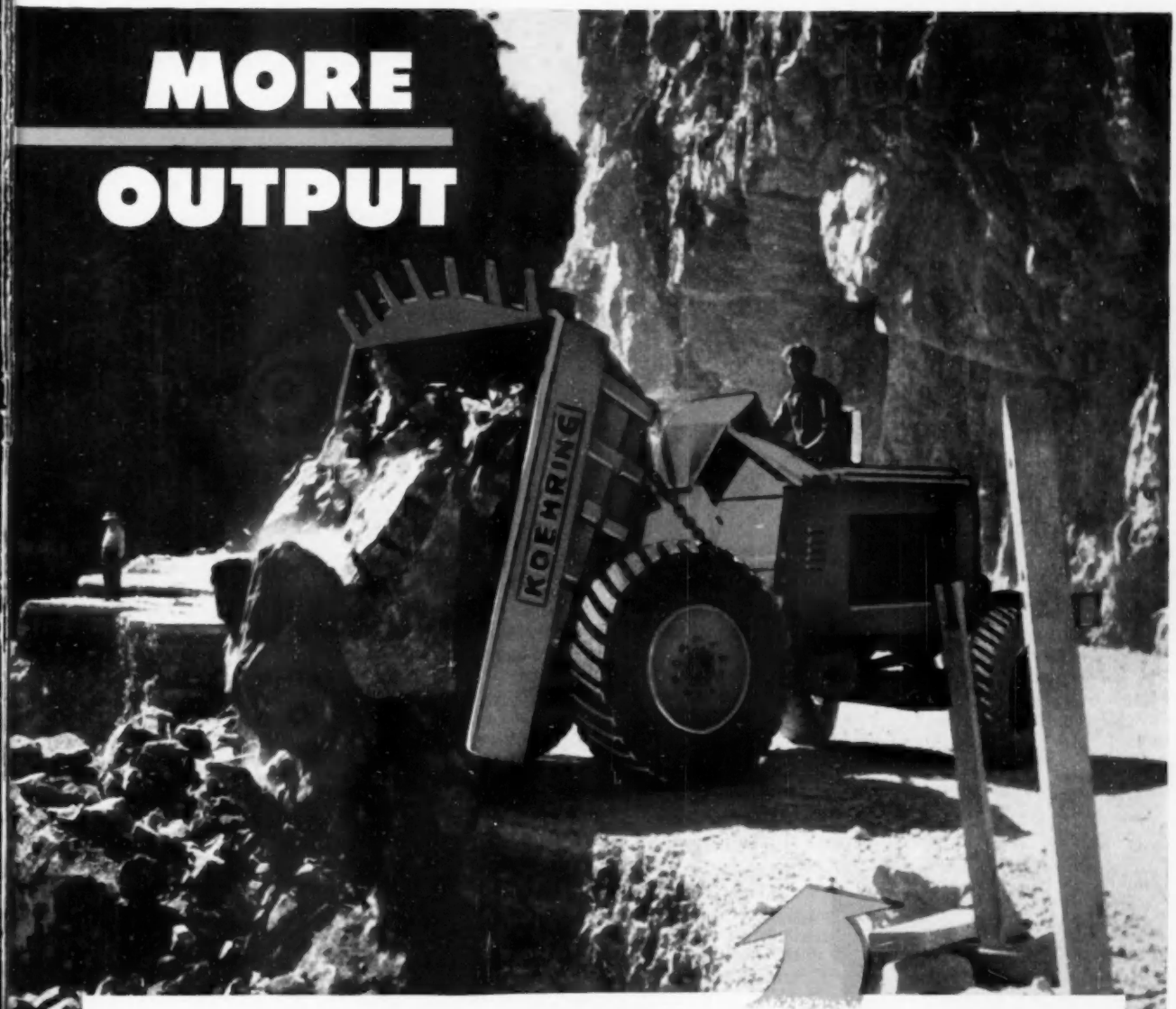
(Koehring Subsidiary)

XI2EE

C. S. JOHNSON CO.

CONCRETE PLANTS · ELEVATORS · BINS · BATCHERS · HOPPERS · SILOS

GRAVITY DUMP never balks . . . never wears out. You get the same one-second dumping every time . . . under heaviest loads, and in all temperature extremes. There are no hoist maintenance delays, no costly hoist replacement parts to eat into profits when you use gravity-dump Dumptors.



. . . with ONE-SECOND gravity dump

In just one second, Koehring heavy-duty Dumptor dumps its 6-yard load. Operator trips the body-release lever, and gravity tilts the scoop-shaped body 70°. One second later the load is out, and Dumptor is on its way back for the next load.

Because there's no waiting for slow-acting body hoists, Dumptor saves 15 to 25 seconds on every dump. This earns an important increase in extra yardage output. For example, take a typical 1,000-foot haul where an ordinary dump truck is making 16 trips an hour. Even if Dumptor took the same time to load, haul and return, it would average 17½ trips per hour on the same cycle. That's because Dumptor's one-second dumping advantage saves an average of 20 seconds on each trip . . . gains a total of 5.3 minutes more productive haul-time per hour. This, alone, adds 9% more yardage to your average hourly production.

What's more . . . by eliminating only 2 turns each trip, Dumptor no-turn shuttle-hauling adds another 10% increase in yards per hour. You'll find Dumptor® well worth looking into. See your Koehring distributor soon.

CX338

KOEHRING COMPANY MILWAUKEE 16, WISCONSIN
(Subsidiaries: KWIK-MIX • PARSONS • JOHNSON)

New Equipment

Continued from page 67

heads up to 50 feet and capacities up to 67 gpm. The pump is fitted with two pre-lubricated ball bearings, and has a mechanical seal that is said to eliminate stuffing box leakage.

Ignition Shielding

Manufacturer: Titeflex, Inc., 500 Frelinghuyaun Ave., Newark 5, N. J.

Claims: A line of ignition shielding for Le Roi mining, construction, and allied machinery is now available.

Designed to protect ignition systems against water shorting and dust explosions—and to shield against unwanted radio wave interference from the electrical impulses of heavy machinery engines—the new flexible metal hose lines completely encase exposed ignition leads between magneto cap and spark plugs.

For all jobs where weather conditions or moisture condensation cause damping and shorting of engine ignitions, flexible metal shielding is providing quickly installed protection. The convoluted tubing conduit, with its tough wire-braid covering and protective silicone rubber jacket, assures a durable protection for insulated wires against moisture, abrasion, vibration, and similar mechanical damage.

In addition, the new shielding has undergone hundreds of hours of in-field and laboratory testing to point-up the protection it affords against ignition failures due to the deteriorating action of oils, greases, gasoline, and ethylene glycol.

The entire assembly is permanently waterproof, including the NC type mechanically coupled brass fittings. When installed, couplings and shielding hose create a metal-to-metal seat—producing a seal between the fitting body and the spring-washer effect of the hose itself. Since fittings and hose are assembled mechanically, with simple hand tools, no brazing or packing is required.

Shielding of all reciprocating engine ignition systems against the emission of electrical impulses is required on nearly every government job where radio communications are used. The specially designed ignition harness meets all government specifications for effectively blocking electrical disturbances of engine circuits which might interfere with radio broadcast and reception.

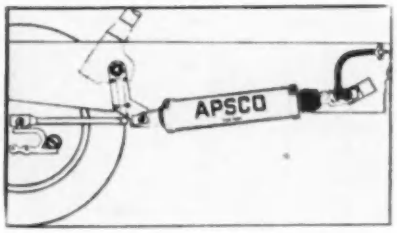
Ignition shielding of heavy machine engines also provides highly efficient explosion proofing against electrical sparking on jobs where dust concentrations in the air are a hazard.

Power Steer Booster

Manufacturer: Air-O-Matic Power Steer Corp., 24 Noble Court, N. W. Cleveland 13, O.

Claims: The improved 1953 Model POWER STEER BOOSTER is a fully automatic steering device which utilizes compressed air to supply power for safe, easy steering on all commercial type vehicles. The easily installed booster eases tiresome physical effort required in steering trucks, tractors, mobile-cranes, off-the-road and heavy road construction equipment.

The compact, self-contained booster is constructed mainly of anodized aluminum; is rust and corrosion-resistant. It requires only a few fittings for easy, quick installation on old or new vehicles without altering or removing any part of the steering mechanism.



One end of booster is fastened to a stationary member of the vehicle and the other end to a movable part of the steering linkage (Pitman arm, drag link, tie rod, etc.) Only one air line is needed. The device can't jam or freeze.

Generator

Manufacturer: Homelite Corp., 67 Riverdale Ave., Port Chester, N. Y.

Claims: A new dual-voltage 5-kw carryable generator will carry a continuous load of 5000 watts, single-phase, 60 cycle alternating current at either 115 or 230 volts.

Designated Model 32A115/230-1, the generator has enough power to

NEWCO* WIRE ROPE
CLAMP
AND THIMBLE
*trade mark
..the heavier the load, the tighter it holds!

Pat. No. 2600417
Pats. Pend. in other countries.

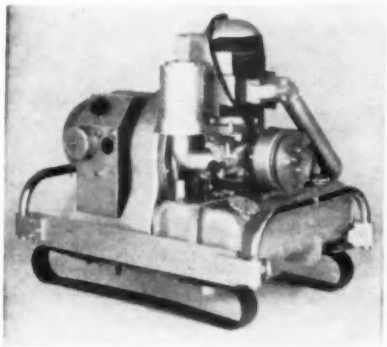
● NO SLIPPAGE
● 11 SIZES TO FIT WIRE ROPES FROM ⅛" TO 1"
● DEVELOPS 85 TO 90% ULTIMATE ROPE STRENGTH (95 to 100% Catalog List)

The strongest and most efficient attachment for wire rope. Made of permanent castings with standard replaceable bolts and nuts. NO WRONG SIDE—threads either way. Easy to install and never needs lubricating.

See your distributor or write direct to

NEWMAN MFG. & SALES CO., Inc.

Dept. EE-2 Box 5939, Kansas City 2, Mo.



start and operate a great variety of electric tools and equipment such as electric saw, grinders, drills, routers, tampers, as well as taking care of emergency lighting and standby power needs.

A 115-volt AC standard convenience outlet is supplied, together with a special waterproof three-pole receptacle for connecting either 115 or 230-volt motors, tools, and appliances. Driven by a Model 32 gasoline engine, the generator has specially impregnated armature and coils to give high resistance to oil, moisture, and abrasive dust. For maximum compactness, the armature is keyed directly to the one-piece, drop-forged, engine crankshaft; and the large size carbon brushes are easily accessible. Voltage regulation from no load to full load is about four per cent.

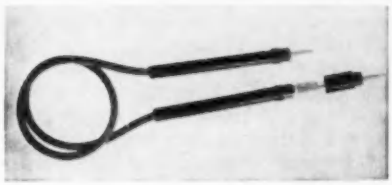
The generator has ball and needle bearings at every point of friction. Pressure vapor oiling system assures adequate lubrication of all engine parts. All major castings are of durable aluminum alloy. Rain and dust proof ignition, plus an adjustable jet-type pressure fuel system for the cylinder, air cooled, two cycle gasoline engine are features of the unit.

Multi-Control Valve

Manufacturer: Gre-Sen Manufacturing Co., 628 Colfax Ave. N., Minneapolis 11, Minn.

Claims: A new multi-control hydraulic valve is designed to actuate two double or single acting cylinders or a combination of one single and one double acting cylinder. Center sections are available, which make additional controls possible in any desired combinations.

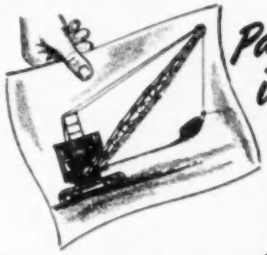
High pressures within the valve are always equalized and balanced, thus preventing the unit from becoming locked in any position. The multi-valve is fully balanced and self-centering, with built-in relief valve, adjustable from pressures of 20 psi to 1250 psi. Relief valve has replaceable hardened seat. The multi-valve has tripod mounting and hardened chrome plated spools. Capacity is 24 gpm.



Test-Lite

Manufacturer: Ideal Industries, Inc., 4104 Park Ave., Sycamore, Ill.

Claims: A new pocket-size Test-Glo is designed to combine maximum safety with ease of use. The tester can be used to check electric circuits, spark



Pays for itself...

ON YOUR BOOM MACHINE

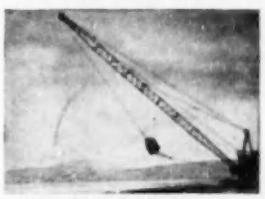
SAUERMAN SCRAPER

When you add a Sauerman Crescent Scraper to your boom machine as auxiliary equipment, you are making a profitable investment which will repay many times its moderate initial cost. This unique bottomless bucket will in many cases, handle a Crescent of up to 50% greater capacity than its regular bucket or clamshell.

On short range work, such as backfilling, grading and similar jobs where material must be moved but does not require lifting, the Crescent is simply cast from the boom tip like the regular bucket. The Crescent bites into the earth wherever it strikes and fills to capacity on the forward pull. The load literally floats along the ground to the discharge point and is deposited when the scraper is raised by the boom line.

When a job calls for digging from a river, deep pit or soft area beyond the reach of the boom, the Crescent Scraper is suspended by chains from a simple trolley that rides on a track cable extending from the boom tip to an anchorage. One drum of the machine raises and lowers this track cable, while the other drum operates the inhaul cable attached to the front of the scraper. Digging, hauling and discharge proceed as in the casting operation. Following discharge the empty scraper is lifted and gravity-returned to the excavation point by merely tightening the track cable.

Above: A 1½-cu. yd. Sauerman Crescent used with a 1-cu. yd. dragline is lifted clear of the levee and returns to the borrow pit by gravity at 1500 fpm.



Above: Boom machine has a boom length of 110 feet and uses a 4-cu. yd. Crescent scraper, replacing a 2½-cu. yd. dragline bucket.

Find out how other operators use Crescent Scrapers on their boom machines for greater economy, efficiency and flexibility. Write today for illustrated literature.

SAUERMAN BROS., INC.

574 S. CLINTON ST., CHICAGO 7, ILL.

plugs, motors, fuses, and a variety of electrical equipment.

Highest quality resistors between each test-prod and lead reduce voltage reaching the leads. Safety rings prevent fingers from slipping onto prods. Handles are long and thin for deep probing.

The enclosed neon test lamp is at the front of the prod handle, always in line of vision. It glows on 80 to 600 volt, AC or DC. Twenty-four inch leads of heavily insulated, 10,000-volt wire give long reach.

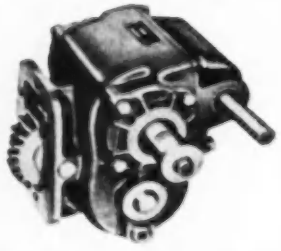
Pumps

Manufacturer: Galigher Co., 545 West Eight South, Salt Lake City, Ut.

Claims: The new Vacseal solids and acid handling pumps are manufactured in rubber lined and all-metal types. Sizes are two, three, four, six and eight inches with capacity ranges up to 3000 gpm.

These pumps operate on the patented "vacuum-seal" principle that prevents fluids or the entrained solids from being forced into the gland. The impeller is a disc with pumping vanes on one side and smaller auxiliary vanes of a greater diameter on the reverse side next to the gland. The auxiliary vanes produce a vacuum on the shaft seal and prevent solids from cutting the shaft or packing. The pumps are therefore virtually "glandless" and require no sealing water to protect the gland and packing.

The Vacseal has many uses in the mining (metallic and nonmetallic), milling, coal, and chemical industries. The pumps handle all types of abrasive and corrosive pulps, slimes, slurries, sludges, tailings, concentrates.



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and
P.T.O. JOINTS
FOR ALL MAKE TRUCKS

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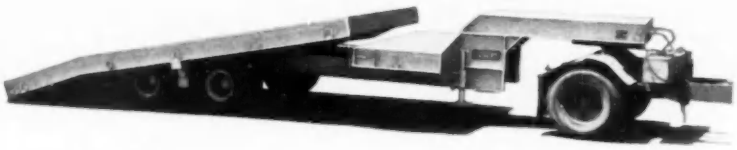
Wm. O. HENSLEY TRUCK PARTS
P.O. BOX 747 1472 WABASH AVE.
TERRE HAUTE, INDIANA



Divided-Deck Trailer

Manufacturer: Rogers Bros. Corp., 136 Orchard St., Albion, Pa.

Claims: One of the features of the new trailer is its carefully balanced divided deck which can be tipped or returned to the traveling position by the weight of one man.

The trailer's longer deck can carry heavier loads of greater area. Better load distribution is promised, with a larger percentage of it on the tractor assuring greater stability.

A double-acting hydraulic ram checks and cushions the upward and downward movement of the deck.

Portable Compressor

Manufacturer: O. K. Clutch & Machinery Co., Florence St., Columbia, Pa.

Claims: Development of a new 75 cfm portable air compressor for standby service or direct production jobs has been announced by the manufacturer.

This new model, to be known as the Hornet 75, will handle the same work as the company's present 85 cfm model, and about twice as much work as the company's present 60 cfm model.

The new Hornet 75 weighs only 1280 lbs., and can be towed at high speed behind a passenger car. It uses a six-cylinder Chrysler engine which has been rebuilt for compressor service. Power from three cylinders of the engine are used for air compression and the other three for power.

The unit is mounted on a three-wheel streamlined trailer and the pivot wheel is retractable.

Tests have shown that the new model will handle a 45-lb. paving breaker, a 45-lb. rock drill, two backfill tampers, two clay spades, two riveting guns, or any combination of two small tools. Production of the new unit started after tests were completed in the field on pre-production models.

Signaling System

Manufacturer: Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.

Claims: A dependable, signal tone selective signal system has been developed and is now being produced.

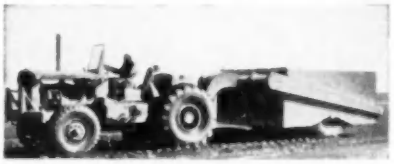
The system has been designed for use in conjunction with any communication medium—two-way radio, land lines, microwave or power line carrier, anywhere that remote control or receiver selection is a necessity.

The function of the system is to allow any operator to initiate an operation at one or more remote points through an intervening communication medium. The operation may be the selection of a receiver or group of receivers from many receivers in a system, the selection of a relay transmitter, the illumination of a lamp on an indicator panel, the sounding of an alarm, any operation that can be remotely controlled by a relay.

Roller

Manufacturer: Southwest Welding & Manufacturing Co., Alhambra, Calif.

Claims: A new 100-ton compaction roller with advanced yoke design rolls on 44-ply 2100 x 25 tires with a rated load per tire of 53,000 lbs. The unit



features four unitized weight boxes. Each box can rise and fall 12 inches to follow uneven ground. The large diameter steel tubing yoke is constructed in sections to permit the use of three of the six weight boxes, each riding on its own tire and each free to rise and fall independently of the others.

A new feature is the manner in which inside beams are full-circle welded to the yoke, instead of being bolted in place. This prevents torsional weaving and simplifies rearrangement of the weight boxes as required by varying ground conditions.

On gravels, medium clays, and silts it is claimed that a maximum compaction of 6-12-in. lifts is reached with only four to six passes. The oscillating compaction roller is also manufactured in 15, 25, and 50-ton sizes.

Bucyrus-Erie Leadership in Walking Draglines...

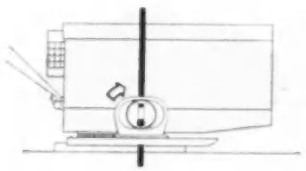
Exclusive ROLLING-CAM WALKING ACTION

One big reason why Bucyrus-Erie draglines are such smooth, steady workers is that they are smooth, steady *walkers*. They can step out in any direction . . . on loose sands, over swampy ground, along muddy river bottoms and the edges of banks . . . through weather that would stop crawler mounted machines.

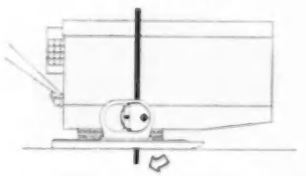
There's no jerking . . . no shocks to machinery, either, because the weight of the dragline is cushioned with almost unbelievable ease by Bucyrus-Erie's exclusive rolling-cam walking action.

100L52C

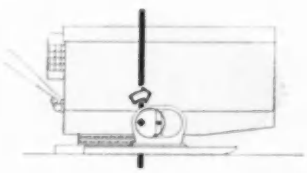
No other walking system is so smooth, so strong or so simple in design



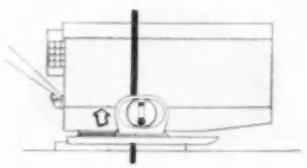
1. Working position. Shoes up — cams in center — guide roller pin at top.



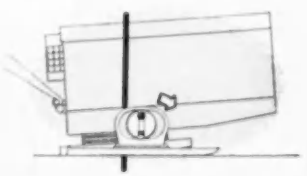
4. Base is lowered as cams continue to roll.



2. Cams rotate — advance shoes and place them on ground.



5. Rotation completed — return to original position.



3. Leading edge of base lifts and skids along as cam rolls to half-way point in rotation.

BUCYRUS ERIE

South Milwaukee
Wisconsin

NOT in the *Contract*

From Texas comes this story of a successful and influential businessman who lay dying, and summoning his best friend to his bedside, elicited from him a promise to see that his mortal remains be cremated. The friend agreed, but asked cautiously and with deep reverence:

"And what would you want me to do with the ashes?"

"The ashes?" from the dying man.

"You will place them in an envelope addressed to the Collector of Internal Revenue, and tell him that 'now he has everything.'"

"So you had a date with a shovel operator?"

"No, I tore my dress on a nail."

Girl Shovel Runner: (At Dance) "Wait here for me, Bill, while I go powder my nose."

Girl Shovel Runner: (Three dances later) "Have you been waiting long?"

Shovel Runner: "No, but I've been looking for you to give you your compact."

The club members were bidding farewell to one who was leaving for India. In the conversation, a friend said: "It gets pretty hot in India at times. Aren't you afraid the climate might disagree with your wife?"

The man looked at him reproachfully.

"It wouldn't dare."

"Wow!! I wonder how many sticks they're using!"

The two skeletons in the corner closet were grumbling about the heat, the dust, the boredom. "What are we staying here for anyway?" one asked.

"Darned if I know," the second skeleton answered. "I'd leave here in a minute if I had any guts."

A lawyer was always lecturing his office boy, whether he needed it or not. One day he heard this conversation between the boy and one employed next door.

"How much does he pay you?" asked the latter.

"I get five thousand dollars a year," replied the lawyer's boy. "Ten dollars a week and the rest is legal advice."

When the little mink died and went to heaven, St. Peter told him: "We haven't had any mink up here before, so we don't know exactly what to do for you. However, you were a very good little mink on earth, and we will give you whatever you want."

"Please, St. Peter," said the mink, "Could I have a coat made of chorus girls?"

He: Where does your lap go when you stand up?

She: It retires to the rear and pops up under an assumed name.

Customer: "I'd like to try on that dress in the window."

Clerk: "I'm sorry, Miss, you'll have to use the dressing room."

The bargaining for a cow had been going on leisurely for an hour. Finally the prospective purchaser came flatly to the point.

"How much milk does she give?"

"I don't rightly know," answered the farmer who owned her, "but she's a good-natured critter, and she'll give all she can."

"Why do those trees in the orchard bend over so low?"

"Well, you would bend over, too, if you were full of green apples."

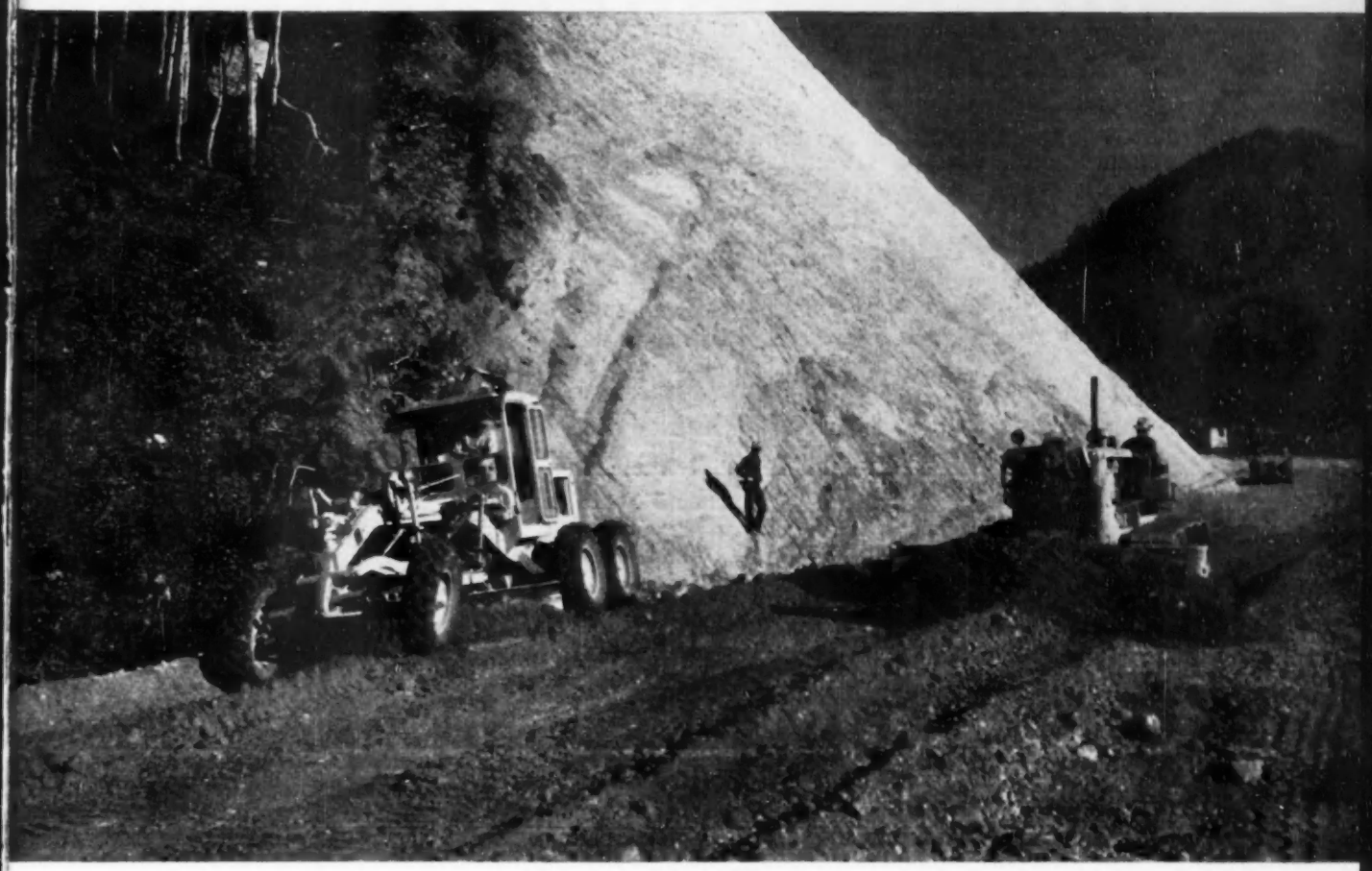
Said one stork to another: "Is my face red—but how was I to know they weren't married."

A psychiatrist saw another psychiatrist plodding down the street carrying a couch on his head.

"Why the couch?" he called after his colleague.

"House call," replied the burdened one.

Don't send a LIGHTWEIGHT to do **HEAVY** grading



Heavy grading is no job for balky, fragile equipment. That's why you see a Caterpillar No. 12 Motor Grader on the job in the picture, and almost everywhere heavy grading is required.

The powerful, durable Cat* Motor Grader not only is equal to the toughest jobs, but it does them quickly and inexpensively. It has a performance record and life line which no comparable equipment can match.

The No. 12 above is being used by Kiely Construction Co., Butte, Mont., on a 4-mile relocation job of U. S. 26 near the Palisades Dam, Irwin, Idaho. Besides grading in the rocky cut, the No. 12 also is compacting fill along an 84" culvert. Teamed with the grader on the job are nine D8s with scrapers, and two Diesel D13000 Engines.

Rugged construction backed up by quality materials gives the No. 12 the muscle to endure rough going. It has a circle built of box section that weighs 35 pounds per foot – the strongest circle used on any grader!

In addition, frame, engine and controls are made by one manufacturer. Frame strengths and power train match engine power. The entire unit is designed to *keep the blade where the operator wants it* . . . to stay on the job and out of the repair shop.

Because engine, frame and controls are Caterpillar, you get quick, reliable service from *one* dealer. He will be happy to demonstrate the entire line so you can see for yourself why 99 per cent of all Cat Motor Graders ever built still are in use, still building profits.

Caterpillar Tractor Co., Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

New trade literature

Subject: **Bulldozers and Attachments**

Content: A 36-page catalog of bulldozers and their attachments is published as an encyclopedia in its field. The catalog contains model views showing every size and style of bulldozer made by the manufacturer and cutaway views illustrating their features. Although brief specifications are printed with each model view, two pages in the back of the book are devoted to detailed specifications of all bulldozers made for both track-type and wheel-type tractors. Important components of hydraulic and cable controls necessary for dozers also are pictured and their manufacturing processes briefly discussed. Bulldozer attachments, such as the brush, root and rock rakes, the treedozer, and the stumper are also discussed in the catalog.

Where to get: Caterpillar Tractor Co., Peoria 8, Ill. (Form 30461)

Subject: **Earthmoving Equipment**

Content: A new 48-page book covers all the types of earthmoving equipment manufactured by the Euclid Road Machinery Co. It also contains information on the selection of the proper type of equipment for various types of work and explains the manner in which twin-power—the use of two engines powering separate axles—is employed in some models. The complete line of rear-dumps, bottom-dumps, scrapers, and loaders are illustrated along with job views of them at work. Brief specifications and typical performance figures are given for the various models and individual design features explained. Contractors, mines, quarries, and other users of heavy duty earthmoving equipment may obtain a copy by requesting one on their company letterhead. *Euclid Equipment for Moving Earth, Rock, Coal and Ore.*

Where to get: Euclid Road Machinery Co., Cleveland 17, O.

Subject: **Sufficiency Ratings**

Content: A 70-page bulletin contains the nine papers presented at the 31st Annual Meeting of the Highway Research Board. In addition the bulletin also carries an Appendix on Procedures. The Research Board meet was held in January, 1952. An entire session was devoted to a review of the problem of sufficiency ratings. (See April, 1952, *Excavating Engineer* for article "Sufficiency Ratings Alert Public to Highway Needs.") The bulletin has this to say about sufficiency ratings: "Sufficiency ratings procedures have been devised so as to provide a means of evaluating the relative adequacy of each section of a highway according to certain prescribed standards. Since these standards are prescribed on the basis of traffic volume and the functional characteristics of the system, the resultant ratings give an evaluation of the road section's ability to carry its quota of traffic safely, rapidly and economically. Thus, the ratings have been used to measure, on a comparative basis with other highway sections, the relative importance and need for renewal and replacement."

Where to get: Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. ($0.90)

Subject: **Trailer Hoists and Bodies**

Content: The new 4-page bulletin illustrates both the cam and roller and the telescopic hoists, pointing out the advantages of both. The largest hoist, the front-mounted, telescopic TV35, has a 186-in. stroke and easily handles a 30-ton payload. The T4430 twin telescopic hoists are outside mounted to bypass all chassis interference problems. The F8C cam and roller hoist handles 15 tons on 16-ft. body while Model F77C cam and roller has a maximum payload of 25-tons on an 18-ft. body.

Where to get: Customer Service Department, Gar Wood Industries, Wayne, Mich. (W-105)

Subject: **Wire Rope Recommendations**

Content: An informative 16-page *Wire Rope Recommendations* booklet for general contractors is printed in two colors, and is fully illustrated. Wire rope recommendations are included for: Bulldozers, back fillers, angle dozers, skimmers, etc. . . . all such equipment covering the intricate phases of construction. The booklet is designated DH-128B.

Where to get: American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.

ERIE *Standard* 2-LINE REHANDLER

THIS compact Lever Arm Rehandler Bucket of normal proportions has ample closing power to fill to capacity in compact materials, and is so designed that the reeving can be adjusted to obtain maximum speed with capacity grabs in loose materials. We have reduced the "height open dimension" thus requiring minimum headroom, enabling you to pile higher and to discharge into higher hoppers. Lighter weight alloy construction provides more pay load (scoop contents) less bucket dead weight. To see this bucket in all detail write for bulletin 403.

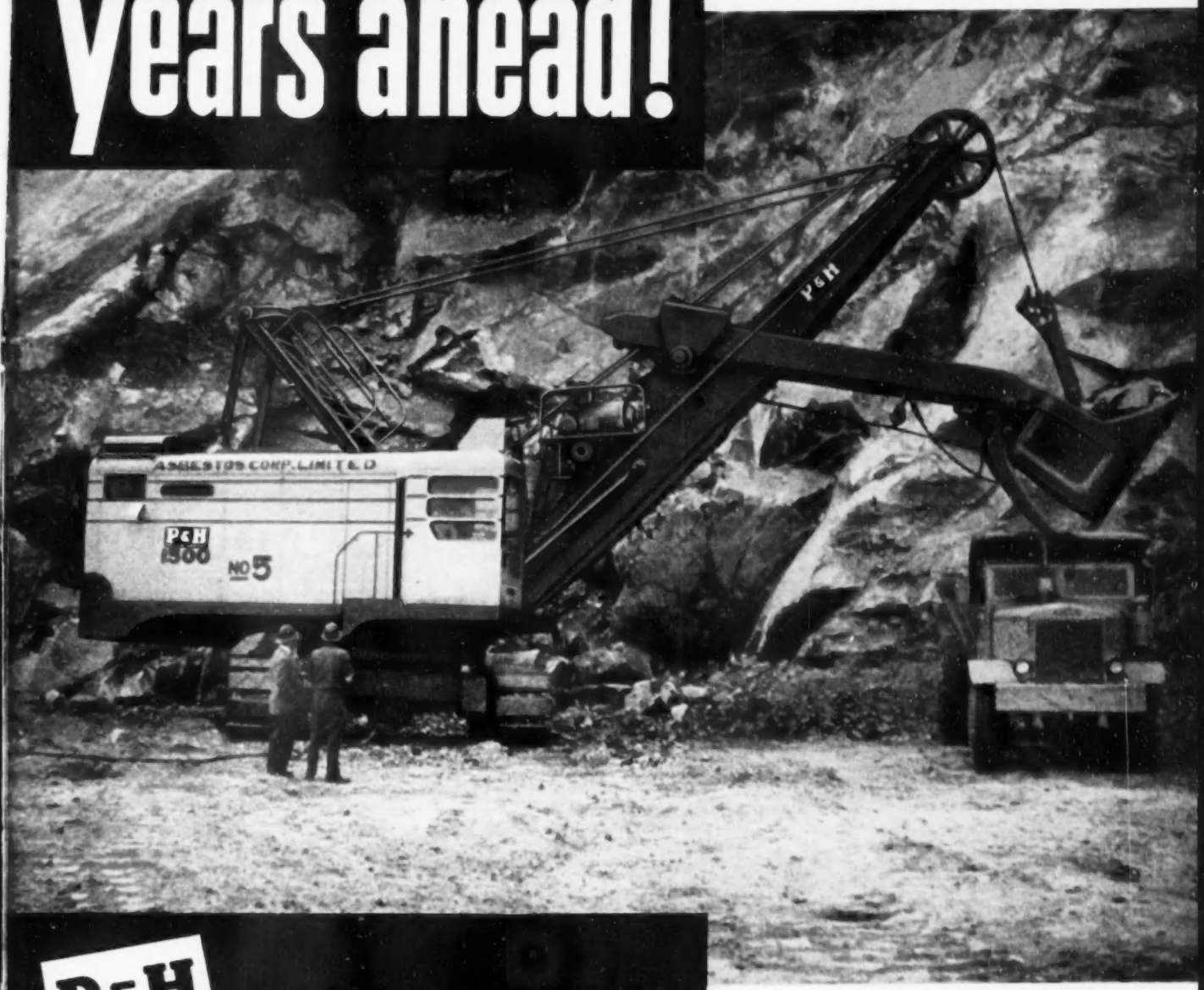
● *Write Department E43*

ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 266 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

years ahead!



P&H

Here's progress far ahead of old fashioned designs — progress that pays off in steadier production . . . lower tonnage costs! For example —

P&H stepless power regulation gives you smoother, more accurate control . . . completely eliminates the complex make-and-break contactors which cause trouble. Furthermore, P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically — gives you faster dipper action . . . freedom from maintenance worries.

But P&H progress doesn't stop with electrical advancements. Here's the ruggedness of welded alloy steels — backbone for a lifetime of service. But let us direct you to a P&H in action — see *all* the modern refinements that make P&H the top producer in the open pit.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

Every third P&H Electric Shovel sold is a repeat order

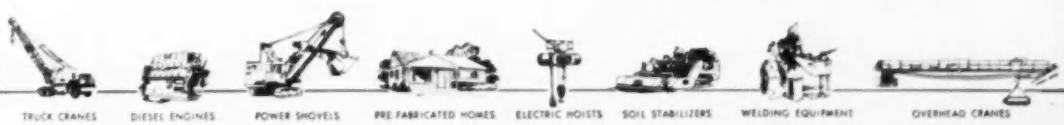
P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER

CORPORATION

MILWAUKEE 46, WISCONSIN

the **P&H** *Line*



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PRE-FABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

2—9-W Bucyrus Monighan Draglines.
1—5-W Bucyrus Monighan Dragline.
1—200-W Bucyrus Monighan Dragline.
1—120-B Bucyrus Elect. Dragline & Shovel.
1—44-B Bucyrus Dragline & Shovel.
1—9-W in Ohio—others in Wash. & Idaho.

J. A. TERTELING & SONS, INC.
Box 1428 Ph. 4-3576 Boise, Ida.

Page 625 diesel walking dragline. 150 ft. boom, 9 cu. yd. bucket, 4 years old. Good operating condition. Price $150,000. Loaded on cars. Location Middle East. Box 3486

Bucyrus-Erie 120-B Shovel serial no. 15941, with 5 yd. Esco dipper. In good operating condition. Location—West Coast. Price $100,000 F.O.B. cars.

Permanente Cement Co.
Permanente, California

Page 625 Electric Walking Dragline, 150-ft. boom, 9-cu. yd. bucket. Excellent operating condition. Price $150,000 f.o.b. cars. Located Middle East. Available approximately May 1, 1953. Box 3504

Bucyrus-Erie 120-B dragline excavator, full electric Ward Leonard control. Serial No. 23065 with 100-ft. boom special cast manganese steel. 48-in. wide track pads including 4½-yd. heavy duty Esco mining bucket serial no. 4130 or a special 6-yd. Esco bucket serial no. 1367 including 940-ft. rubber covered 2300 volt power cable. Located in California.

Thurman and Wright
625 Market St. San Francisco, Calif.
Phone EXbrook 2-8260

Bucyrus-Erie Mdl. 22-B Backhoe equipped with gasoline engine and extra counterweight. Very good condition. Sale Price F.O.B. Evansville, Ind. $14,500. Box 3515

NORTHWEST 80-D Shovel and Dragline, new 1946. Unusually good condition. Murphy Diesel engine.
MARION heavy duty 331 Crane and Back Hoe in excellent condition. Gas engine.
BAY CITY—two each—combination. One Diesel and one gas powered. 1946—1948. Both fine shape.

EDWARD R. GEE
Equipment Broker
P. O. Box 5575 Philadelphia 43, Pa.

Lorain model No. 77 shovel with 2½ cu. yd. Amsco bucket, Caterpillar Diesel engine. $3800 in repairs since use. Sale price F.O.B. Louisville, Ky. $16,000. Box 3511

Bucyrus-Erie 44-B shovel with 24-ft. boom, 19-ft. handle, 2-cu. yd. dipper. Clamshell and lifting crane equipment including 100-ft. boom, Buda Diesel engine. Excellent condition. For further information contact:

D. D. Kennedy, Inc.
Mannheim Road (U.S. 45) at Madison Street
P. O. Box 278 Bellwood, Ill.
Phone Chicago—Estebrooke 8-5223

Northwest model 105 combination shovel and crane. Serial No. 2238. Gasoline engine Twin City. S-0000 (C). Sale price F.O.B. Louisville, Ky. $3800. Box 3510

Northwest model 25; 6; 80D; 95. Manitowoc 6500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.

A. W. Nevers Phone 32 Mt. Pleasant, Iowa

---

*Lorain model L50J combination 1-yd. shovel and lifting crane with 60-ft. boom, pendant suspension 15-ft. jib, powered with Caterpillar Mdl. D318 Diesel engine. Machine is 2 years' old. Very good condition (RSP-194 (B). Sale price F.O.B. Paducah, Ky. $16,000. *Note: Can reduce price if either front end is not required. Box 3509

Bucyrus-Erie Mdl. 22-B Lifting Crane, Serial No. 84803, equipped with Buda gasoline engine Mdl. K428 with 65'0 boom and 10'0 jib. New April, 1951. Very good condition. Sale Price F.O.B. Camp Campbell, Ky. $14,000. Box 3516

Bucyrus-Erie 46-B dragline excavator Buda diesel power, 50-ft. boom, oversize caterpillars. Machine working. Central South. For inspection and price information contact:

Carmichael Coal Company
P. O. Box 707
Jasper, Ala.

51-B Diesel Dragline Excavator mounted on oversize Caterpillars. 70-ft. boom, light plant, and 54-B Diesel Dragline Excavator 80-ft. boom, oversize Caterpillars, electric light plant. Machines approximately 5 years old. Located in central South. For details and inspection reply to: Box 3505

SHOVELS—CRANES—DRAGLINES

38-B crane-dragline 1950 Model GMC diesel.
Model 6 Northwest crane-dragline 1950 Models. Special 33-in. cats—Murphy diesel—two on hand.
38-B crane-drag-backhoe 1948 Model Cat diesel.
All located in Middle West.

Sales Reasonable Prices — **Rentals**
J. C. French, 226 Berry Parkway, Park Ridge, Ill. Tel. TAlcott 3-4927.

Marion type 481, serial No. 6958. 2-yd. Diesel electric shovel with extra 2-yd. bucket. Sale price F.O.B. Louisville, Ky. $10,000. Box 3508

HOMES FRONT END LOADER: ½-yd. bucket; mounts on 1½ to 3-ton truck; used 6 months; $1700.
HOMEMADE TAG-A-LONG TRAILER: 9:00 x 20 tires; used behind 2-ton Chevrolet dump truck to haul Caterpillar D-6 $400. Robert Montcalm, 109 E. Chocolay St., Munising, Michigan.

TWO 8-yd. Page special heavy duty dragline buckets. Good condition. Each $1500.
6-yd. ABC heavy duty dragline bucket, practically new. Complete with attachments. Price $1500.
Location of equipment—Middle East. Box 3503

International TD-9 Diesel tractor shovel with Bucyrus-Erie 1 cu. yd. bucket. New shovel only worked 4 months. 60 days guaranty. Price $8000 F.O.B. Altoona, Pa.

John Ratzesberger & Son
208 S. 24th St.
Altoona, Pa.

ALLIS-CHALMERS HD-7W Tractor with Baker Grade-builder.
BUCYRUS-ERIE H-2 Hydrocrane.
BUCYRUS-ERIE 22-B Shovel with General Motors Diesel Engine.
HOUGH HLD Payloader.
For further details, write or call:

E. F. CRAVEN COMPANY
P. O. Box 538 Greensboro, N. C.
Phone 3-5521

New 27-in. I Beam. 14-in. flange, 40-ft. long, 145-lbs. per ft.
Used HD 5 front end loader.
½-yd. P&H shovel. Ford V8 motor. Has extra boom and drop ball.
TD-40 tractor with Bucyrus-Erie scraper 6-yd. heap loader.

D. M. Stoltzfus & Son, Inc.
Talmage, Pa.

Miscellaneous lot of new GA-2 shovel parts available at great savings. List will be sent on request.

Stuart M. Christhilf & Co., Inc.
134 W. Mount Royal Ave.
Baltimore 1, Maryland

Continued on page 80

The Most Valuable Assemblage of Contractors' Machinery Ever Offered at Public Sale

AT AUCTION

Earth Moving and Construction

CONTRACTORS' MACHINERY

Used in Building the Downsville, New York, Dam—Board of Water Supply Contract 401

On Route 30, Downsville, N. Y.

70 Miles East of Binghamton

TUESDAY, APRIL 28, 1953, at 10 A.M. on the premises

EUCLID BOTTOM DUMPS

34 Model 71FDT with 89W Wagons, 13 cu. yd. capy., 1951
10 Model 67FDT with 58W Wagons, 13 cu. yd. capy., 1950
8 Model 38FDT with 89W Wagons, 13 cu. yd. capy., 1950
34 Model 43FDT with 58W Wagons, 13 cu. yd. capy., 1946-1950

EUCLID END DUMPS

9 Model 8TD with 56Y Bodies, 16.8 cu. yds., 1950
5 Model 49FD with 48BY Bodies, 12 cu. yds., 1947
2 Model 49FD with 12BY Bodies, 12 cu. yds., 1947

EUCLID LOADERS

2 Model 9BV with GM Diesel Engines, 1951
Model 109W Dolly for 9BV Loaders, 1951
Model No. 3BV with a Cummins Diesel Engine, 1946

SHOVELS and CRANES

2 No. 1055 P & H 3 cu. yd. Shovels with Buda Diesel Engines, 1948
No. 54B Bucyrus Erie 2½ yd. Shovel, Buda Lanova Powered, 1947
Day Smith Lugger Crane, Type 100
Oshkosh Tractor Crane Model TE with Gar Wood Crane

EARTH PROCESSING PLANTS

Robins "Grizzly" Pervious Earth Treatment Plant, capy. 2600 cu. yds. (3500 tons) per hour
Robins "Grizzly" Impervious Earth Treatment Plant, capy. 1350 cu. yds. (1750 tons) per hour
Robins H D Scalper with LeRoi Gasoline Engine, 1950

TRACTORS

2 Allis Chalmers Model 8D19H with Bulldozers and Le Tourneau Power Control Units, 1948
3 International Model TD24 Tractors, 1951

GRADERS

Allis Chalmers Model AD-3, with GM Diesel and Scarifier, 1947
2 Caterpillar No. 12 Diesel Powered with Scarifier Attachment, 1946

TOURNAPULLS

9 Le Tourneau Model C1H with Cummins Diesel Engines, 1946

MISCELLANEOUS

K-30 Rooter
3 Rock Rakes
3 Rome Disc Harrows
16 Sheepsfoot Rollers — assorted sizes and makes
Jacques Model K Hydraulic Auger
22 Kohler Lighting Plants from 1½ to 5 KW Capacity
4 Worthington 1500GPM 2-Stage Turbine Deep Well Type Pumps (2 Diesel Driven and 2 Electric Driven)
Tunnel Forms — 30 ft. Unit. Non Telescopic Straddle Type Traveler
Blaw-Knox Steel Panel Concrete Forms — approx. 20 tons
Lambert Elec. 3-ton Mine Hoist with 100 H. P. Westinghouse Motor
24 Atlantic Transformers from 15 to 100 KVA
9 New 3 to 25 H.P. Electric Motors
1950 Plymouth 4-Door Sedan
1948 Reo 2-ton Platform Truck

Sale By Order of

Bianchi, Central, Munroe-Langstroth, Rugo—A Joint Venture
Owners

The equipment may be inspected any week day during business hours from April 14th to day of sale—other inspections by appointment with the Auctioneers.

A Profusely Illustrated Descriptive Brochure is being prepared and will be mailed upon application to

SAMUEL T. FREEMAN & CO.

Auctioneers

1808-10 CHESTNUT STREET, PHILADELPHIA 3, PA.

80 FEDERAL ST., BOSTON 10, MASS.

For Sale

Continued from page 78

Two Model 29-T Bucyrus-Erie electric blast hole drills with tools. Excellent condition.
Basic Refractories, Inc.
Maple Grove, Ohio

Bucyrus-Erie 60-ft. boom. Drum with steam ram and levers to convert 41-B steam shovel to crane work.
DARIEN
60 E. 42nd St. New York, N. Y.

22-T Drill No. 40883—G.E. electric motor 440 or 220 volts, 3 phase, 60 cycle—in good operating condition.
Concrete Material Company
3000 W. Madison Sioux Falls, S. D.

WANTED TO BUY

Wanted: Oversize caterpillar mounting for Bucyrus-Erie Model 44-B. Box 3489

May We Help You?

If you do not find the equipment you want listed in these columns, write to:

Excavating Engineer
South Milwaukee Wisconsin

HELP WANTED

MASTER MECHANIC

Wanted: A man with wide experience in maintenance and operation of power shovels. Location, India and Pakistan. Two to three year contract. Transportation and living quarters provided. Excellent opportunity. Write Box 3514, outlining full details, qualifications, experience, salary desired, and references.

Notes from the manufacturers

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., announces that its industrial tractor dealers now offer four-wheel scrapers to fit every job and every crawler tractor. The line includes seven models with struck capacities ranging from two to 18 cubic yards. According to the company, this line was made available through the integration of four of their own models, formerly manufactured by LaPlant-Choate, with three made by Gar Wood.

Electric Steel Foundry Co., Portland, Ore., opened a new branch office in Salt Lake City, Ut., February 1. The Salt Lake City office will provide more close-to-home coverage of the intermountain territory comprising Utah, Colorado, Southeastern Idaho, Southwestern Wyoming and will afford greatly improved service to ESCO customers and dealers in that region. Garland T. Allen, who has been representing ESCO in the Portland area for about 11 years calling on logging, construction, and processing industries, is manager of sales. The establishment will consist of an office located at 1455 S. Second West and it will draw on ESCO's coast warehouses for stocks to supply the territory's requirements.

Euclid Road Machinery Co., Cleveland 17, O., announces the appointment of a new distributor for Iowa, the Herman M. Brown Co., Inc. Headquarters are at First and Sheridan Streets, Des Moines, with branches in Sioux City and Cedar Rapids. The Brown organization is known as Iowa's oldest and largest construction equipment distributor. It carries a complete line of nationally known equipment and maintains exceptional parts and service facilities. Herman M. Brown will represent Euclid in all Iowa with the exception of ten counties in the Southwestern section of the state. Executives of the organization are: Herman Brown, president; Ben Brown, general manager; M. D. Burnes, sales manager; Russ Hookom, service manager; and Glenn Passick, parts manager.

General Electric Co., Schenectady 5, N. Y., completed another step in its decentralization program on Nov. 25, 1952, with the opening of a multi-million-dollar plant for the manufacture of fractional-horsepower motors at Linton, Ind. The plant will be engaged in the production of the company's newly-developed Form G motor. The plant will manufacture split-phase motors for fans, blowers, centrifugal pumps, office appliances, and other general applications where moderate starting torque and quiet smooth performance is needed. The new Form G motor embodies a new concept of motor design and manufacture. The line to be produced at Linton weighs from 20 to 40% less per horsepower than the models it replaced, and is considerably smaller in size. Versatility of application has been broadened and appearance modernized.

Koehring Co., Milwaukee, Wis., has appointed new distributors for territories in Wisconsin, California, and Florida. In Wisconsin, Kelbe Bros. Equipment Co. of 5686 N. Teutonia Ave., Milwaukee, will handle Koehring Products for the entire territory. The line includes equipment manufactured by Koehring and its three subsidiary companies: Parsons Co. of Newton, Ia., C. S. Johnson Co. of Champaign, Ill., and Kwik-Mix Co. of Port Washington, Wis. In Florida Koehring has named Allied Equipment, Inc., 825 N.W. 72 St., Miami, to handle Koehring products only in the 13 southern counties of the state. The Northern California territory, which has been covered by Koehring Co. West Coast Sales Division out of Stockton, has been delegated to the Standard Machinery Co. of 450 Bayshore Blvd., San Francisco. In addition to Koehring equipment, Standard Machinery also will handle the sale of Parsons products.

Timken Roller Bearing Co., Canton 6, O., has appointed John Fellows field engineer. Fellows, who joined Timken Co. in 1949 as a sales engineer trainee, will work out of The Timken Company's Milwaukee office. A graduate of the engineering college of Ohio State University, Fellows served for two years in the United States Army during World War II.

Worthington Corp., Harrison, N. J. has named W. A. Finn, assistant general sales manager. Finn, who is returning from Paris, France, where he has been serving as general European manager, will now make his new headquarters at the Harrison, N. J. offices. Finn was graduated from the Naval Academy at Annapolis in 1922 and served in the U. S. Navy until 1926. He then joined Worthington as an application and sales engineer in the steam power division. From 1930 to 1941 he acted as New England district sales manager and then was granted a leave of absence until 1946 to serve with the U. S. Navy. During that time he was graduated from the U. S. Naval War College in Newport, R. I., in December 1942, and served on the staff of the Allied Naval Commander-in-Chief U. S. Expeditionary Force and later as staff commander of U. S. Naval Forces in Germany. Upon his retirement with the rank of Captain, USNR, in 1946, he rejoined Worthington as manager of the export department.

Powered right for fast loading

Lugano Bros., Inc., of Belleville, N. J., depend on Cat* Diesel Engines in their shovels. This Lorain with a 1¾-yard bucket is powered by a husky Caterpillar D13000 Engine. Loading fill for road construction in Caldwell, N. J., the shovel puts 10 yards of earth in each truck in less than two minutes.

On this job the truck schedules are irregular because of a five-mile haul, but the shovel is able to average 1,800 to 2,300 yards in a nine-hour day.

One reason why contractors choose Caterpillar power for their excavating machinery is simple, dependable, economical operation. Cat Engines use No. 2 furnace oil without fouling. Twelve sizes of engines and electric sets, producing up to 500 HP or 315 KW, are available. Leading equipment manufacturers can supply these money-saving power units in the machines they build, and your Caterpillar Dealer can furnish them for replacement power. His reliable service and genuine parts stock add to their long, trouble-free work life. Let him prove their dollars-and-cents advantages on your own jobs.

Caterpillar Tractor Co., Peoria, Illinois.

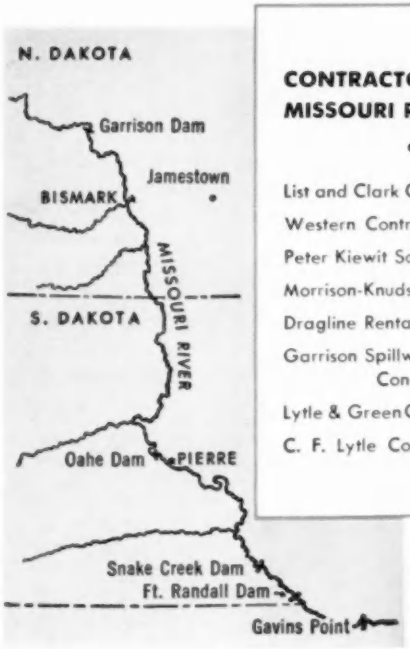
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

It's 89% "Euc" on the Missouri dams!

An 11 yd. shovel loads 50-ton Rear-Dump Euclids in just over a minute at Ft. Randall Dam.



CONTRACTORS ON THE MISSOURI RIVER DAMS

- List and Clark Construction Co.
- Western Contracting Corp.
- Peter Kiewit Sons Co.
- Morrison-Knudsen Co.
- Dragline Rental Co.
- Garrison Spillway Constructors
- Lytle & Green Construction Co.
- C. F. Lytle Construction Co.

The six big dams now under construction on the Missouri River comprise the largest earth moving project ever undertaken. More than 200 million cubic yards of earth and rock will be loaded, hauled and placed for these flood control and power dams in North and South Dakota.

At Oahe Dam, which will be the world's second largest earth fill dam, and also at Gavins Point and Jamestown Dams, 100% of the earth hauling equipment is Euclid. The contractors working on the other three projects—Fort Randall, Snake Creek and Garrison—are also using more "Eucs" than all other earth moving units combined.

The Euclid team that's helping to harness "Big Muddy"—Rear-Dumps, Bottom-Dumps, Loaders and Scrapers—gets the job done on schedule at the lowest cost per yard. That's why the contractors are using and depending upon "Eucs" to the tune of 89% of all their earth moving equipment. There are over 200 Euclids, ranging in capacity from 15 to 50 tons, making the dirt fly on these jobs.

Want facts and figures that show how and why "Eucs" move more loads per hour at more profit per load?

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO
CABLE ADDRESS, YUKLID. CODE: BENTLEY

EUCLIDS *Move the Earth*